SUPPLEMENT.

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Original Correspondence.

THE SCOTCH IRON TRADE—No. VIII.

THE GLENGARNOCK IRONWORKS.

Situated about a mile from Kilbirnie Station on the Glasgow and South-Western Railway, the Glengarnock Ironworks have several distinguishing characteristics peculiarly their own. There are altogether nine blast-furnaces belonging to the works, but only seven are at present in operation. One is in course of reconstruction, and is expected to be ready for "blowing-in" very shortly. In our account of the Ardeer Works, which belong to the same proprietors—Messrs. Merry and Cuninghame,—we referred to a successful attempt that had been made to effect the utilisation of blast-furnace gases, and the process by which this desideratum is carried out at Glengarnock forms, perhaps, the most interesting—it certainly is the most novel—feature of the works. The gas is carried from the top of the furnace, immediatly below the charging ports, into an upright pipe, from whence it is conveyed through a horizontal pipe, 4 ft. 10 in. diameter, to the boilers; another pipe, forming an inclined plane, and measuring about 12 in. diameter, being used to carry the gas directly into the furnace of the boiler. At the end of the pipe forming the inclined plane, and immediately above the furnace-door, there is a slide-valve, which regulates the supply of gas, shutting it completely off when necessary, or transferring it from one boiler to another. The gas is admitted into the furnace in a considerable volume through a square nozzle. In the horizontal pipe, which conveys the gas from the blast-furnace to the boilers, there are a number of valves placed both above and below for cleaning the pipes, and for allowing the gas to escape in the event of an explosion. When this plan of utilising the gases was first attempted at Glengarnock explosions were frequent, although never serious, and it taxed all the ingenuity of the gentlemen connected with the works to devise ways and means for their prevention. The ultimate triumph of the system is due to Mr. Baird, the late manager of the works, who left only the other day to undertake the management of the Lonsdale Ironworks, at Whitehaven. At several ironworks in England the utilisation of the gases is effected by means exactly similar in principle, although, of course, with slight differences in detail. The main difference between the two is that in the English furnaces charcoal has to be used, whereas at Glengarnock nothing is required but coal. A small fire is kept burning on the hearth of the furnace, to prevent the risk of an explosion of the gas, but for any other purpose this fire is quite useless, the heat of the gases being more than sufficient to keep up the boilers. The works at Glengarnock are laid out in a very uniform and economical manner. At each end of the row of blast-furnaces there are six boilers; some of them are two-flued, and others have only a single flue—the former being 7 ft. 3 in. and the latter 6 ft. in diameter. In every case the length of the boilers is 35 ft. The patent damper of Mr. Auld, of Glasgow, is used to regulate the steam.

The blast is supplied to the furnaces by three large engines, the oldest one, which has been in operation since the works were started in 1841, having been made by Mann, Pearson, and Barr. The steam-cylinder is 35 in. in diameter, and the stroke is 8 ft.; this engine originally supplied blast to three furnaces, but now it can only keep two in blast, the higher pressure used now-a-days compelling a greater amount of motive power. The blowing cylinder is 94 in. in diameter. The second engine, which was made by Mr. Barclay, of Kilmarnock, dates only as far back as 1859. The steam-cylinder is 3 ft. in diameter, the length of stroke being 7 ft. The breadth of the beam is 46 in. by 24 ft. in length. The capacity of this engine is scarcely so great as the other, and it is only used, therefore, to blow a furnace and a half. These two engines occupy one building at the north end of the works; the third engine, which is situated at the other end, has a blowing-cylinder 4½ ft. in diameter, and a stroke of 9 ft. This engine was built by Murdoch and Aitken, of the Cranstonhill engine-works, Glasgow, and has been in operation since 1845. It is capable of blowing four furnaces, and is actually doing that work at the present time; it is not so long since it had to supply blast for six furnaces, but the increased number of tuyeres, and the greater pressure, from 2½ to 3½, now used, would prevent it from doing so effectually at the present day. As it is, the engine works at the rate of 60 revolutions per minute, and blows at a pressure of 4 lbs. to the square foot. Inside the blowing cylinder there is a large pipe, 5 ft. 2 in. in diameter, which connects the engine with the receiver. The air is admitted into the receiver by a series of valves, both above and below. It is claimed for this engine that it is one of the largest of the kind in Scotland.

The height of the furnaces at the Glengarnock Works varies considerably. The furnaces more recently erected have been built to the height of 80 ft., but the older furnaces are only 50 ft. high. Two of the furnaces are built on the bell and cone principle, which is now so well known to all practical men that it needs not to be described here. The same furnaces are worked with a view to the utilisation of their gases, which is materially aided by the application of the bell and cone. The air receiver, which communicates the blast to the furnaces, stretches from one end of the works to the other. It is 6 ft. in diameter, and receives the blast at three separate ports. At the present time another furnace is being rebuilt from the foundations so as to secure the utilisation of the gases. It will also be made much higher than before. It is intended, in course of time, to alter every one of the furnaces in the same way. The heaters, as well as the boilers of the engines, are supplied with gas. Each heater contains 40 pipes. As a proof of the immense saving by the utilisation of the furnace gases, we have only to mention that whereas formerly it required 50 wagons of coal and dross per day to supply the heaters and boilers, the consumption now for the same purpose is not above one wagon daily. The charge used at the Glengarnock Works is 18 cwt. of ironstone and lime to 14 cwt. of coal.

The furnaces are all charged in the usual way, the hoists being wrought with small engines. Between the sixth and the eighth furnaces there is a girder bridge 80 ft. in height, from which access is obtained to the scaffold. A stack, which was formerly used to receive the smoke and vapours from the heaters, is now applied as a column whereon to rest this bridge. The lift communicating with the girder-bridge is of large dimensions, and is worked by a pair of horizontal engines, with locomotive cylinders 12-in. diameter, and 2 ft. 4 in. stroke each. The hoist is worked with double eccentrics and link motion.

At the south-east end of the works there is a beam engine for pumping up the water from Kilbirnie Loch, which immediately adjoins the works, for the boilers and tuyeres. From the Loch the water is lifted to three large reservoirs on the bank in front of the furnaces. One of these reservoirs is used solely for domestic, the other two being for manufacturing purposes. The pumping-engine is constructed with two plungers. From the Kilbirnie Loch the works can always, both in summer and in winter, command an ample supply of water. Altogether, the Glengarnock Ironworks will cover about 12 acres of ground. There are various sidings in and about the works, communicating with the main line of the Glasgow and South-Western Railway; but Messrs. Merry and Cuninghame have several private lines of their own, in connection with their colliery system. Attached to the Glengarnock Works there are 569 wagons and several powerful locomotives for removing minerals to and pig-iron from the works. A large quantity of the pig-iron is shipped at Ayr and Ardrossan; but the most of it is sent to Glasgow for transhipment to all parts of the world. The Glengarnoch brand is specially in request in America. The production of the Glengarnock Works is considerably over 1000 tons per week, and the number of men and boys employed is not short of 500. The employees have excellent dwelling-house accommodation provided for them in the immediate neighbourhood of the works, and Messrs. Merry and Cuninghame are extremely solicitous in regard to the moral and social requirements of their workmen.

It may be added that there is a large range of workshops attached to the works in which the various mechanical appliances in operation are either made or repaired.

MINING NOTES FROM NORTH WALES.

The minerals of North Wales are now being more fully developed than they have yet been, and several mines that have been abandoned and now water-logged are about to be re-opened by companies formed for the purpose, having the requisite capital for working them energetically. One of the great wants in connection with many valuable mining properties appears to be machinery sufficiently powerful to keep the water from accumulating, and where such has been provided the results, as a rule, have been satisfactory. The production of lead ore is increasing, the out-put at present being at the rate of upwards of 30,000 tons per annum, giving about 170,000 ozs. of silver and 7000 tons of zinc. Of late there has been a growing disposition on the part of capitalists to invest in the lead mines of North Wales, and the great success which has attended the Van since it was taken by the present company has led to the opening out of properties adjoining it. Indeed, some six or seven mines in Montgomeryshire raise more ore than the whole of Flintshire. In the adjoining county of Denbigh the Minera takes the lead. There are at present a good many mines in the Mold district standing, owing to the water and the want of the necessary pumping-power, and which will yet become profitable by the introduction of capital. The Denbighshire Consolidated Mines, to work which a company has been started, are spoken very highly of in the district, and the promoters are sanguine that they will yield very handsome dividends indeed, seeing that they are situate in the centre of a highly mineralised district, whilst the lead has been fully proved, a 12-in. lift being sufficient for the water.

The recent heavy rains have rather seriously interfered with the working of the Old Mold Mines. It is said that a new pumping-engine is to be put down on the eastern part of the sett. Those mines have been highly profitable, and with the machinery named will no doubt continue to be so.

The East Maes-y-Safn is still standing, and we understand an offer has been made to purchase it as it stands for 4000*l*. The mine was formerly known as the Pwllywheal, also as the Bryngwyn, and has been worked more or less for some years, 85 tons of ore, giving 385 ozs. of silver, having been raised in 1868. It has been a very good property by itself, but would now be considerably more so if worked in connection with the adjoining mine, the Glan Alyn, which is also standing, and from which a good deal of rich ore has been raised. It now requires that the shaft should be sunk deeper, so as to drain the water. Should the offer to purchase the Maes-y-Safn be accepted we may then hear of it and the Glan Alyn turning out highly remunerative; the latter is a comparatively shallow mine, the greatest depth being 55 fms. The out-put of ore has been from 3 to 4 tons to the fathom, and by driving out east and west the ore would be intersected under the former workings. At one period upwards of 50 tons of ore per month was raised at Glan Alyn, at the comparatively trifling cost of 35s. per ton, and which realised from 12*l.* to 13*l.* per ton.

At North Hendra the lode continues good and remarkably rich, but progress has been to some extent impeded by the wet weather. They have been sinking a new shaft and driving an adit level, and the mine promises to be a valuable one.

The Crewgog Mine, near Mold, has started under favourable auspices. When worked before, without the aid of machinery such as is now found at most places, it paid very handsomely, and will do so again.

The Great Fron Fownog Mine has also started again, and with the 85-in. cylinder pumping-engine will be able to clear the mine of water, and it is expected that the sinking of a new shaft will be proceeded with rapidly. When previously worked the mine realised very good profits when royalties were considerably higher then they are at the present time, so that the prospects as to the future are in every way promising.

For a considerable time past the shareholders in the Rhosesmor Mine have been looking forward hopefully to the place being opened out and worked, so as to show some likelihood of paying a dividend. There has, however, been no change, and it is still standing. It was at one time thought that it would be worked in connection with the Hendra, by which means the water could be cleared, but at present there is no appearance of such a consummation. The Rhosesmor has been a good property, for in 1868 there was raised from it 420 tons of ore, giving 302 tons of lead and 3371 ozs. of silver, so that the ore is, perhaps, only equalled by the very best found at Talargoch.

The Horse Shoe, or East Pant-y-Buarth, it is said is about to be opened out by a company who will put down a large pumping-engine. The sett lies to the north of the Mold Mines, and to the south of the Great Fron Fownog. The mine is highly spoken of in the district, and practical men well acquainted with the locality consider the undertaking one that will repay those who have taken to it.

The Messrs. Dawes are opening out the Pant-du Mine, about six miles from Mold, and there is every reason to believe that they will be well repaid for their enterprise. It was worked in 1866, in which year some 20 tons of ore were raised; but with capital and the requisite machinery and appliances—which are wanting at many mines in North Wales—a large quantity of ore will, no doubt, be raised.

There are several small lead mines in the Mold district doing a moderate business, but in many instances good results could be obtained by increased capital. In the Halkin Mountain a considerable tonnage of ore is being raised, and some new ground is being opened out. In that locality an excellent seam of fire-clay of considerable thickness has been found. At Plasnewdd a new mine is being opened on the estate of Mr. Hughes, of Kimmel Park, and the men are now engaged in driving out and getting some little lead in the leaders. The field is said to be a fine one so far as the minerals are concerned.

Ironstone is now being raised in considerable quantities in different parts of the Principality. Mr. Hodginson, of Flint, a few days since, whilst we were visiting Mostyn, produced an excellent specimen of hematite ore which is being raised in Cardiganshire. Mr. Coogan, of Messrs. Muspratt and Co.'s Chemical Works, analysed a sample which yielded 51·78 per cent. of iron. Mr. Coogan states that "It is one of the richest Welsh ores, which I have yet examined." The Mostyn Company are also raising a considerable tonnage of ore at Cwm, and which is mixed with Spanish and other stone. The production of pig-iron in North Wales will be much larger this year than ever it has been, there being now two furnaces in blast at Mostyn. The total will in all probability exceed 60,000 tons.

There is a brisk demand for coal of almost every description, and the collieries in Denbighshire and Flintshire are being well worked. Some of the seams reach up to nearly 15 ft. in thickness, and in several places there is an aggregate of 60 ft. of coal of a workable character. The beds also run under the basin of the River Dee, and it is said that there is sufficient to keep up the present average supply from that source alone for 300 years.

At the Wrexham Colliery, one of the largest in the district, and where some time since there was a large irruption of water, business is proceeding satisfactorily, and large as has been the outlay in sinking and overpowering the water, it is now in a fair way of recompensing the proprietors.

The Ruabon district is the most important with respect to collieries in North Wales. The principal lessors includes Sir W. Wynn, whose residence is close to the place, and Mr. Whalley, M.P. The British Iron Company raise a good deal of coal, as does the Westminster. The Vron is also a well-known pit of Messrs. Maurice and Low. At Bryn-yr-Owen a large tonnage is being drawn, a good deal going to Birkenhead and Chester.

The coal mines in Flintshire are raising a larger tonnage of coal than is usual at this period of the year, and as the Great Western carries nearly the whole of the produce of Ruabon and Wrexham, so does the London and North Western take nearly all the coal that is conveyed by railway from the Flintshire pits. A good deal of coal, however, is shipped at various points on the river Dee for Ireland, and even more distant countries. The farthest point at which the coal measures are worked to any extent is Mostyn, although there are two or three small pits in the Isle of Anglesea, the output of which is trifling.

At Mostyn the Three-yard and the Five-yard coal is being got, and considerable quantities are sent by water. In the same neighbourhood is the Hanmer Colliery of Messrs. Eyton and Elliott. The coal worked is that known as the "Mostyn Three-yard coal." In connection with the seam named is the fact that when cut through a large feeder of water was tapped. At Hanmer a feeder was tapped some time since, when the water was of such a peculiar character that Mr. Craig, the manager, had it analysed by Dr. Muspratt, of Liverpool, who found it to be of an average quality with the best Harrogate water.

About two miles from Holywell is Bagilt, where is the largest colliery shaft in North Wales, or probably in the kingdom. It was sunk under the superintendence of the eminent mining engineer, Mr. J. T. Woodhouse, of Derby, and is 20 ft. in diameter inside the tubbing. The Battersfield Colliery, as it is termed, is likely to become the most important in the county. The workmen have got through the two main seams, the Five-yard and the Three-yard coal, and are about to drive out. Sir W. Jackson, we believe, was one of the principal promoters, but a company, we were informed, was being formed, with a capital of 150,000*l.* to work it.

At Flint, the Flint Marsh, or Red Pits, are doing well, and a seam of coal 9 ft. thick recently met with is being worked.

At Buckley, a couple of miles from Hawarden, the collieries are doing well. The Little Mountain is sending a good deal of coal away by railway for locomotive and other purposes. The Buckley Colliery has been taken by a private company, while the owners of the South Buckley are engaged in making a tramway from the pit on to the main line.

The Aston Hall Colliery, sunk on the estate of Mr. W. E. Gladstone, M.P., is now looking in a very healthy state, raising a good deal of coal. A branch line of railway is being made down to Queensferry, by means of which they will be able to ship or send on to the London and North Western. It is expected that before long the company will be in a position to raise from 500 to 600 tons of coal daily. In connection with the colliery an interesting event took place a few days ago, which was in the highest degree creditable to the workmen. It appears that towards the close of last year small-pox raged with great virulence in Ewlor, where the colliery is situate, when Dr. O'Kelly was most assiduous in his attendance upon the sufferers. To mark their sense of such kindness, Mr. Young, the manager, and some of the men, waited on Dr. O'Kelly, at his residence, and presented him a handsome timepiece, with the following inscription:—"Presented to Dr. O'Kelly, by the workmen of the Aston Hall Colliery, for his kind attention during the late outbreak of small-pox in 1871." The Ewlor Hall Colliery, under the management of Mr. E. Parry, is sending away a large tonnage of coal.

Business is active at Queensferry, a considerable tonnage of coal being sent to Ireland and other places from the Eleanor and other collieries in the neighbourhood.

In the Mold district the water has got into some of the pits and caused some trouble. The Bronfield Colliery, one of the leading pits in the district has been taken to by a Manchester Company, in connection with the Old Mold Town Colliery, and it is believed that working will very shortly be commenced. The Argoed Mine is in full work, and the men are driving out the levels. Owing to an accident the Bronwhllfa Colliery has not sent out much coal of late, but the repairs having been completed, the pit will resume its position as one of the first in the locality. The Oaks Pits continue to send out from 400 to 500 tons of coal a day, and for which there is a very brisk demand for steam vessels as well as for other purposes. At Coppa, noted for its fine cannel seam, business is active, there being markets for all the coal raised, especially the cannel. A large quantity is used in the production of paraffin, and Mr. Marston is very busy in both making and refining. The pits at work at Leesewood are going on steadily, but there does not appear to be so much cannel raised as formerly.

In conclusion, it may be said that trade generally is all that could be desired, ironmakers as well as colliery proprietors participating in the prosperity which marks the state of those important industries in all parts of the kingdom.

BORING MACHINERY.

Sir,—The reading of an account of an invention for improvements in boring and in winding machinery connected with boring for minerals, wells, blasting, and such like purposes, recently patented by Mr. H. S. Dunn, of Riccarton, Ayrshire, leads me to enquire whether wire-rope is the best to use in boring operations. Mr. Dunn states that his invention consists, firstly, in a new and improved construction and arrangement of the parts as a whole of a boring and winding-machine respectively, for boring the first holes down through rocks and other strata of the earth, for searching for minerals, and for other purposes, and for winding or raising and lowering the wire rope and pump within the hole or bore, for clearing it out when the boring rods are withdrawn therefrom, from time to time; and, secondly, and especially, in a new construction and arrangement of the immediate actuating mechanism, for giving the vertical reciprocatory or "jumping" action to the boring rods and tools of the said machine, applicable also to other such like boring-machines. Now, it seems to me that most inventors pay an excess of attention to the lifting apparatus, or perhaps I should say that they continue to attend to a part of the machinery which is already very good, and do not consider the rods themselves, or whatever is to be used as a substitute for the rods.

The improved general construction and arrangement of the parts of his machine consist, Mr. Dunn says—

"In a main rocking lever, formed of two malleable iron plates bolted together through three or more flanged hollow "distance" bosses and a segmental end, to which the working chain of the boring brace and tools is attached, so as to reciprocate vertically over the bore or hole. This lever, having its rocking centre and end actuating or connecting-rod centre keyed through the side plates and two of the hollow bossess, the main centre rocking in pillow block bearings upon an iron plate secured on the top of a strong open wood frame, secured at one end of a similarly strong horizontal and rectangular basement frame, which has the sole plate, carrying the bearing blocks of the actuating boring machinery or shafts and gearing, secured to the other end below the actuating end centre of the rocking beam, it and the boring tools being reciprocated by the new arrangement of duplex sliding connecting-rod, connecting it with t

crank or eccentric pin of a new loose actuating disc on the end of the main transverse driving shaft, close up to and coupled and actuated by overlapping clutched pieces of its main driving spur-wheel; also that the revolution of the shaft and driving wheel carries the crank disc, pin, connecting-rod, and lever, over and past the top centre, after every fall of the tools (whatever may be their height or position, and that of the lever during their descent or boring action) the two parts of the connecting-rod sliding on each other to compensate for this, and then draws down the connecting-rod and beam to the lowest centre of the crank-pin, and over or past it, when the weight of the boring rods at the other end of the beam (thus always raised to the same position or height) are free to fall and make the tool cut, every stroke carrying up the connecting-rod and the crank pin or loose disc round on the up stroke "overrunning" their driving-wheel and clutches, which come round in due course, and again drive or turn these parts over the top centre, as before stated, in succession every revolution of this driving shaft. This shaft is actuated through an intermediate shaft and two sets of reducing wheels from a first motion fast speed shaft, actuated by a belt and driving pulleys, or direct from the winding-engine of the steam or motive-power crab winch for lifting and lowering the boring bars from time to time for the insertion of the wire-rope and its clearing pump, which are worked by a special winding-drum and dudlicate set of shafts and gearing, reducing wheels (described for working the boring mechanism) placed below the upright framing and rocking lever, so as to be actuated by the same first motion shaft; one reversing handle and its connections answering to throw the pinion of the boring mechanism on this shaft out of action, as the other pinion of the wire-rope winding mechanism is thrown into action, and *vice versa*; or otherwise both pinions out of action, when neither set of gearing is required, as when lifting or replacing the boring rods."

Perhaps the best system of boring-rods were those introduced, I think, by Mr. Kind, and which consisted in combining wood and metal in such a manner that the rods were but a little heavier than the water; in fact, it could only just be said that they did not float. The boring was effected by the fall of the tool itself, the weight of which sufficed to give the cutting action; this was known, I believe, as the free-fall system. After each cut the rods were descended, and picked up the tool ready for another fall. The sole objection that I could see to this system was that the rods were difficult to adjust, and the system of flotation appears admirable. What seems to be wanted is a really good gripping apparatus, and a floated wire-rope, or a combined wire and wood rope, having a specific gravity somewhat greater than water. The use of such an apparatus and rope would permit of boring at a much lower price than at present. There would be no difficulty in using a flat wire-rope, and attaching short lengths (say, 6-inch lengths) of wood thereto, so as to float it, and the advantage would be that the combined rope would readily run over a suitable sized drum. The surplus rope could be wound upon a drum, the partial rotation of which could be made to give the necessary lift to the rope. The drum could be provided with suitable gear, to permit of the rope being let out as required, and with the assistance of a very small engine the rapidity with which the tool could be raised and released would be considerably greater than has hitherto been supposed possible.—*Glasgow, April* 30. COLLIERY MANAGER.

ON THE PRICE OF TIN, AND THE IMPROVED STAMPS.

SIR,—I have just spent twelve days in Cornwall, visiting my old haunts through different towns and mines, and it was quite charming to behold the gladdened countenances of every grade of society, in consequence of the great rise in the price of tin. All backs of lodes, burrows, brooks, and sea beach are hunted up, not a stone is left unturned. The cry is ever "Find tin;" the very poorest of the refuse is harrowed up and ransacked, and many machines are constructed for grinding it finer than the stamps did. These separate the hitherto waste portions of the tin, and are said to be producing the metal in quantities sufficient to pay dividends. Many tons have been sent into the market from this source, and practical men affirm that they (with improved machinery) can work up old backs of lodes and waste heaps containing as little as 6 lbs. tin per ton of stuff at a profit. In that case, should the present price of tin continue, there are old abandoned lodes and refuse rubbish enough in Cornwall to supply them for generations. Cornishmen need not emigrate, as every industrious man can make his home comfortable; but they should, and must, look to the great, cumbersome, and expensive fire-stamps used as their mineral pulverisers. Can they improve them? To me the question arises are these stamps, as Cornishmen say, to the height of perfection? It is well known that many Cornishmen are decendants of the ancient Britons, and stubbörn subjects; they cling to their old traditions, and the laws of their forefathers; but they should bear in mind that the railroad and the electric telegraph are among them, and if they wish to make money they have now the chance: then let them discard their old laws and traditions, be up and doing, otherwise the stranger, with his inventive genius, will be among them, and the bird will slip out of their hands and fly to the bush. In that case they will retrograde, like the wild Indian, and be no more seen in their native haunts. If they conform to the times, or the age we live in, with this godsend—the rise in tin—it will be the means of employing thousands, and of bringing millions of money into the county; and then the labourers, the adventurers, the merchants, and the lords will all thrive in their own native place.

I may say that my days are few, but I wish to see these men thrive in their native land, and stand to the Cornish motto, and harrow up every thought of their inventive genius, and bring in stamps to do the work on the first principle. As it is at present it is not worked even on the second principle. To me it is the most defective, cumbersome machine I ever looked at. See its axle, heaving at almost a right angle to its work, grinding tongues against tappets, and lifters against the back brasses, with nearly 100 feet in length of the most cumbersome and ponderous axles to drive 80 heads. This machine, Cornishmen attempt to argue, is brought to perfection;—in reply to this, I may say that I am not a novice in mining, or in machinery. I will not here stop to relate what I have invented or done, but at once openly assert that the Cornish stamps must be remodelled, and worked on the first principle, which is a much cheaper one. All stamp-heads must be lifted with less friction than a piston-rod, and 20 feet of axels is sufficient to lift 80 heads, and no engine-house or main-beam are required, the engine to burn only half the coals, and 1 lb. of engine-power is to be made to lift 5 lbs. For argument sake, I will warrant the weight of one head to lift five; then, I argue that if I throw off half the weight, saving half the coals, and the house and machinery work better and cleaner, a sane ancient Briton cannot surely stand forth and say it is no improvement. I know there are men among this class who are so ignorant and so bigotted that under no ordinary circumstances could they be brought to believe that the stamps, or anything connected with them, could be improved; but I am highly pleased to so say that I found them in my round far better than I expected. A few turned their backs on me, and would not look at my stamps, making the remark—"Dos't thee think thee can improve the stamps? No one can do that." One manager of a mine turned his back on me at an hotel, where he was share jobbing, and even before I opened my model he said he had seen that 50 years ago, and then left the room. A second came into the commercial room of my hotel, in a state of intoxication, where there were five or six commercial men, and insisted on my showing him my working model. Those were the only two I had to complain of. Had I met them at the mine in the morning, before they had drowned their wits, they might have known better how to conduct themselves.

I called at Wheal Jane, and met all the agents. They were certainly taken by surprise when they saw me set my model to work, with a weight of 1 lb. lifting 5 lb. I called at Tincroft. Captain Teague was not there, but all his agents were very civil, and admitted being taken by surprise. I met Captain Jos. Vivian at North Crofty, an old experienced miner, accustomed to stamps all his days. He called in all the agents of the mine and engineers, and pressed me to come again to that meeting. I had not time to go again on that day, but will hereafter. I called at Dolcoath. Capt. Thomas was not there, but I found Capt. Tonkin, one of the oldest and most experienced agents in Cornwall. I will make no comment on what he said, further than that he highly approved of my invention. I called at Cook's Kitchen, where I did not know a single agent. They all felt surprised at the working of my model. I called at Penhales, and saw Capt. Bennet, with all his agents. He came to see me again. They were all highly pleased. Called at Polbreen, where I saw one of the Captains, one of the Wheal Lovell agents, and a tin dresser. They were all surprised, and highly pleased. I called at St. Agnes Consols, where I saw the captain and Capt. Doidge, of East Wheal Rose, who were also well pleased. I called at Wheal Kitty (St. Agnes), but the agents were gone to see some newly discovered lode. I had not time to call again, but shall at some future period. I must confess, on the whole, I met with a wonderful reception. I did not meet one practical miner as an opponent. I called at Buckley, St. Austell. Capt. Williams was absent. I called at Hayle Foundry, and met with Mr. Husband, the manager. He said I had decidedly made a great improvement in the Cornish stamps. He said that Mr. Lane, an engineer, was coming from Liskeard to the foundry, and pressed me to stay and dine with them. I did so, when Mr. Lane and Mr. Husband both agreed that I had made a material improvement on the Cornish stamps. I forbear saying more on their remarks at present.

I have not wholly confined myself to the stamping department, but have taken up the grate, or outlets. Tin is a ponderous ore, and it is kept so long under the stamps that too much of it becomes fine slime. It is in this they lose their tin, which is carried down the stream. It wants a quicker outlet. If tin be left in the rough it is easily caught and reduced, but fine slime is difficult to catch, and with all the means used at present a great portion is constantly going to the ocean. N. ENNOR.

St. Teath, Camelford, Cornwall, April 30.

AN OUTLINE OF GENERAL FACTS RELATIVE TO CORNWALL, CORNISH MINING, &c.

SIR,—A visit to the mines of Cornwall at the present time will show that the ancient glory of that famous mining county is again shining with all its wonted splendour; mine after mine is being set to work; the new districts, or those containing maiden ground, are being developed with ardour. In the old or extensively-worked ones the ores have to be raised at a heavy cost from great depths; in the new they are at the surface, or but a little below it.

Cornwall is a maritime county, the most westerly of England, surrounded on all sides by the sea, except the east, where it is bounded by the River Tamar, which separates it from Devon. Its extreme length is about 90 miles, and its greatest breadth about 42; but in the narrowest point, towards the Land's End, it is not more than four miles across from Mount's Bay, on the English Channel, to the Bristol Channel. It was called by the Romans Danmonii; but its name Cornwall is variously accounted for. The most easy and probable derivation seems to be this—When the Saxons had driven the Britons into the extremities of the country they called one part of the retreat Wales, and the other part to which the Britons retired they called Cornwall, either from the shape of it, which resembles a hunting-horn, or more probably from the large promontories running out like so many horns into the sea. For the Ancient Britons called a horn "corn," and horns in the plural number "kern."

Vespasian is supposed to have been its Roman conqueror, about A.D. 41; but little is known of its history till a much later period. But I am of opinion that the Cassiteridies included Cornwall with the Scilly Isles, first mentioned by Herodotus (born B.C. 484), said to be famous for tin mines, though he admits that he could furnish no information respecting them. Aristotle (born B.C. 384) and Polybius (born B.C. 206) also allude to the Cassiteridies. Strabo describes the Cassiteridies as being inhabited by men in black cloaks, with tunics reaching to their feet, carrying staves in their hands, and bearded like goats. Cornwall abounds in forts and encampments, which are lasting records of the various people that have had military possession, and interested themselves, beyond doubt, in the staple of the county to the furtherance of their commercial pursuits, and to protect the tinner in the quiet occupation of his business. Phœnicians and Jews were evidently the people who searched for the tin, and required the protection of the military against the barbarious inhabitants. The forts and encampments are in the immediate vicinity of stream works, some of which continue to be wrought even to the present day. So far as streaming for tin in former times is concerned, the same mode of operation was pursued then as now, water being the prime agent to discover and clean it. Norden observes—"Former times, as it seemeth, have not been ignorant of the benefit of their Cornishe tynworkes, and auntientes have not been idle in the searche of them. It is supposed that the Jews first endeavored to dive into their rocks for this commodious minerall, thowgh they then wanted theys preuayling instruments which latter times doe offorde. Their pick-axes were of weake mater to comaunde the obdurate rocks, as of holme, which some call holer or huluer, of boxe, harte's horne, and such like, which kind of tools modern tyn men find in old forsaken workes, which to this daye retayne the name of Altall Jarazin. The Jews cast off workes in their Hebrew speache." The most productive stream in Cornwall was that in the road from St. Austell to Polgooth, and from thence west to St. Stephen's, and around Resugja Castle, where from the adjoining hills, which are traversed by rich tin veins (as, for instance, can be seen at the Fortescue Tin Mine, where there is a vein of considerable dimensions, which has recently been discovered by a farmer in ploughing, and from the back of which rocks of tin over 3 cwts. have been found), from which the surface of the whole circumjacent country is more or less impregnated with grain tin, it being an alluvial deposit, or the residuum of floods washed from the backs of the veins, and carried down the valley, where it is probable that it was first discovered, like gold in Australia, in the alluvial deposits. These deposits are found in all the great tin-bearing districts throughout the county. Tin is an article in which the county from the time of the Phœnicians has always had the preeminence, and is said to produce more than all the world besides. Copper, lead, iron, &c., are also found here in great plenty. At the time the Romans worked our streams they had attained considerable progress in the arts; statuary had attained great excellence, and tin was necessary to form their casts, bronze having a large part of this metal as a constituent in its composition. Copper the Romans procured from the islands in the Mediterranean and Spain, but tin they found only in the Cassiteridies. J. HARRIS-JAMES,

Grampound-road, Cornwall, May 1. Civil and Mining Engineer.

SPATHOSE IRON ORE IN CORNWALL.

SIR,—In the article in last week's Journal under this heading it is stated that the Ebbw Vale Company have the exclusive monopoly of the Somersetshire spathose; but this is not actually the case, as there is another well-known company in the field, and the most valuable tract of spathose property in the district (which is extensive, and probably the only remaining one of the class in the country) has just been acquired by myself, with the view of getting it worked by a suitable firm. The Ebbw Vale Company possess a good tract of property, which will turn out much ore if well worked; but for many years past a great part of the produce of the mines was smelted for ordinary purposes, and their discoveries of ore are worked to a considerable depth. The veins continue very productive downwards, but, on account of peculiar geological features, the greatest skill and judgement are needed in maintaining a supply.

Some of the spathose deposits I have examined in Cornwall are unfit for making good spiegeleisen, on account of the amount of impurities they contain. The sample analysed by Dr. Tosh is better than some in this respect, though not equal to others. As a rule, I believe that where the spathose veins occur in the vicinity of other veins furnishing sulphides, as ores or gangues, there they are most likely to be found contaminated with impure minerals, and where the adjacent country furnishes deposits of manganese the percentage of that element in the spathose is likely to be good. I say this after many years observation, as it may serve some usefully. The Somersetshire deposits are remarkable in this respect, there being no veins except of iron and manganese in the locality. These appear to be the only vein minerals of the district, and sulphur and phosphorus never make their appearance in any form. Some of the ores yield over 20 per cent. of protoxide of manganese, but the average is nearer 14 per cent. The ore analysed by Dr. Tosh is very satisfactory in this respect, which is so important as regards serving the Bessemer process.

When pseudomorphic action has taken place in spathose veins, *psilomelane* and *manganite* commonly occur in most interesting and beautiful forms, and during some ten years, while I developed the Brendon Hill Mines, I collected minerals of this character, as well as gothite and pseudomorphs of hematite after spathose, which gave so complete an insight into the mode of formation of the veins as to be of great value in directing the mines. A few years ago the mines were so developed as to enable me to guarantee the Ebbw Vale Company 60,000 tons per annum, but at that time they had not succeeded in using the ore successfully, after many years trial, so that they decided to reduce the output and diminish the stock at the mines, which had increased to nearly 100,000 tons. On my retirement from the direction of the mines there were enormous quantities of ore opened out and in backs which they hardly knew what to do with. After, by acting upon the plainest principle, they succeeded in making spiegeleisen, so that their ore reserves became valuable, and now they would, no doubt, be glad to see their way to 60,000 tons per annum for many years to come. I mention this as an example of how the prospects of a good undertaking may suffer by inability to appropriate the advantages it offers.

I regard the achievement of the manufacture of spiegeleisen in this country as introducing a new era in its metallurgical industry, and as opening up sources of great wealth. There are, no doubt, many deposits in Cornwall which (even if not quite equalling the purity of the Somersetshire ore) will become valuable on this account, and I am glad to find from different quarters that attention is being directed to the matter, and hope that it will result in working some good deposits. Anyone who can forward this end will do good service to Cornwall and the country at large. MORGAN MORGANS.

Mansion House, Bristol.

ON WHAT DOES METALLIC MINING DEPEND FOR ITS SUCCESS GENERALLY?—No. I.

SIR,—The question heading this letter is one which I need scarcely say is of practical import, and therefore to answer it correctly ought to be regarded as of practical utility. The thoughts which spontaneously arise in my own mind in view of this question are that the success of mining depends—First, on a judicious selection of the mines themselves; and, second, on the proper application of capital and skill in their development. The difficulties which beset mining in the early stages of its development are sometimes great and very perplexing, especially in new districts, which are not unfrequently characterised by lineaments decidedly peculiar from those with which the person on whom devolves the responsibility of directing the exploratory operations had been previously acquainted. The consciousness of a deficiency of knowledge under such circumstances, and the embarrassment which arises therefrom, produce a pause from whence analogy is again and again reverted to, so far as the knowledge and the experience of the individual himself extends; and that failing, from the want of sufficient data to continue the process, science is vaguely reverted to in the abstract, probably because of its being the ideal of an undefined conception of the mind, which, gilded by the fancy, presents a shadowy and intangible outline, and thus the term science, as an abstract generalisation, has come to be regarded as the indispensable antidote for all the ills which beset the system of mining.

It has been thought by some, because I oppose the presumption that mining is necessarily obstructed in its progress, and injuriously affected in its pecuniary results, by the prejudices of practical men leading them to oppose a more general application of the sciences, that I at least regard their extended application as an innovation on the domain of practical mining; but it will be only necessary to say, for the information of those who do not know me personally, that I have always been one of those that form the vanguard of progress in mining, and that I not only recognise but have recourse to all the sciences which are practicable, with economy, and that I have the means of embracing. Yet, at the same time, I am free to confess that mere theoretic twaddle is hollow to the ear and deficient to the understanding, because inharmonious with facts coming under my own observation in the arena of practice; and until my reason is sufficiently enlightened in consonance with the dictates of experience I shall be the subject of no compunctions for declining to entertain such novelties, and refusing to endorse them.

There are questions relating to a variety of subjects which I am obliged to take on trust, because I do not possess sufficient data by which to determine their genuineness or otherwise, and of such I entertain no positive conclusions in my own mind, and, therefore, only interest myself so far therein as circumstances render it inevitable. But with mining the case is different. I have seen sufficient—whatever I have failed to see—of this branch of industry, in its varied practical developments and detail, to know that it is a system affected by local and general natural laws, and that the science of geology—the most intimate in its relation to mining—has not yet interpreted to the satisfaction of the miner, at least not to me, the mode of working of these laws. Nor has experience yet succeeded in enabling the miner to frame rules of general application for his own guidance in this most intricate and perplexing part of mining—the exploratory and prospective; and the reason of this, I suppose, is that so many natural facts and features are necessary to be recognised and understood, and also because so many local peculiarities abound, which can only by possibility be known by prosecution of practical measures, and these as they develope themselves tend to so many modifications, which appropriately range themselves under the head of *tactics* in mining, and not only justifies but requires, in the name of common prudence, the so frequent use of provisos, or qualifying terms—thus, *if* so and so. The data upon which the assumptions are predicated do not change, but are constant; certain results are indicated by analogy, and may reasonably be expected by prosecution of the enterprise to be realised. It is, therefore, of paramount importance to mining to ascertain what effect, upon the whole, a change in any of its parts may produce. That such changes do occur, and variable results proceed therefrom, is sufficiently evidenced by the chequered experiences of practical mining, and hence it is evident that during the preliminary or progressive stages its success depends on a number and diversity of favourable circumstances and occurrences, and that on these, in their relations to and mutual effects on each other, the natural adaptation and capacity for successful mining depends.

As I proceed in the investigation of this subject I begin to be apprehensive that I have imposed upon myself a more arduous task than I at first had any idea of undertaking, as the prospect seems to widen as I advance, and to require in its elucidation pointed references to numerous ramifications of natural and experimental science; and hence am afraid I shall be necessitated to crave your indulgence for space in the columns of the Journal for further communications on the subject.

It had been long understood as an established and accepted fact that metalliferous deposits, in the sense designated remunerative, were confined to certain rocks, and to certain periods of the rock formation, and on this presumption I suppose it was that the late Capt. Charles Thomas was induced to say—"It is easier to foretel where metalliferous deposits are not than where they are." But exceptions may be taken and maintained against even a rule embracing so wide a margin as this, since copper is found in very large quantities so high up as the Permian and New Red Sandstone series, intermediate to the Triassic and Carboniferous periods. And it is affirmed by some, both geologists and mineralogists, that this useful metal is not restricted to any class of rocks. But it is not with the exceptional so much as with the prevailing order of metalliferous deposits that the miner has to do, only so far as it is necessary that he should be able to discriminate between the rule and that which constitutes an exception to it, that the evils which would arise from confounding them may be avoided, and hence the relation of geology to mining; and this is the first view and consideration by which the miner should be guided in his estimation, *a priori*, of the value and permanency of metalliferous deposits.

The science of geology, as applied to mining, is a science of observation, and of subsequent reference to some practically approved standard, whose prominent features, indicative of results, are sufficiently pronounced and understood to be relied upon as a standard of reference, determinable by the judgment; and thus a system of literal comparisons and mental references of representative features of one thing or set of things with another is instituted, and deductions consonant with natural facts, approved by reason, are drawn, and constitute the data upon which calculations are made and estimates founded. But the principles of geology which relate with so much importance to mining, had not their origin with that science, but in practical mining, as metalliferous deposits first announced their own existence by intrusion above the surface, and the similarity of circumstances under which they prominently occurred soon impressed themselves, together with their peculiar associations, upon the minds of observers, and thus an involuntary rule was necessarily esta-

blished; and these things have been found to occur with almost unvarying constancy in all parts of the world, and, therefore, by proper observation it is not difficult to discriminate between one class of metalliferous deposits or source of metallic minerals and another.

The history of mining shows that the primary period—Palæozoic series of rocks are, as they ever have been, the most prolific sources of the metals, precious and otherwise; and that of the groups of this period the lower—the unstratified and the stratified non-fossiliferous rocks—are the most prolific; whilst upwards, through the Silurian, Carboniferous, and Permian groups, exceptional deposits of lead, silver, and copper are found, in addition to manganese and iron, their more general products; and, notwithstanding some good mines of lead, silver, and copper are found in the classes of rocks referred to, they must, however, be considered exceptional in comparison with the metamorphic and unstratified rocks, and hence the necessity and importance of being able to distinguish between even the different groups of the primary period. ROBT. KNAPP.

Ellsworth, Nye County, Nevada.

THE WIRE-ROPE AT THE EBERHARDT AND AURORA MINES.

SIR,—We note in your report of the Eberhardt and Aurora Mines that the wire-rope used for the tramway has proved of bad quality. As we are shareholders in these mines it may be implied that we made the rope, and for the sake of our reputation we beg your kind permission to state that it is not of our manufacture.

Millwall, Poplar, May 2. BINKS BROTHERS.

MINING IN COLORADO TERRITORY.

SIR,—A winter not hitherto equalled in severity is well nigh ended. It did not come upon us unheralded. The first snows of November almost "the oldest inhabitant,"—the fall being so deep, and the attendant storms so violent. They were the skirmishers announcing the advance of storm-clad battallions, armed in a frigid empyreal, penetrable alone by the topmost peaks of the Rocky Mountains. From Utah west of the snowy range, from the north and from the south, a like unusual severity characterised the season. The Union Pacific road, for the first time, was seriously and injuriously impeded in traffic throughout the mountain passes, and at times on the plains. The Kansas Pacific was also blockaded early in the season, but not so seriously incommoded during the winter, since no part of the road passes into the mountains. If this winter severity is to be deemed "adversity," the miners of Colorado, especially those of this region, take great comfort in estimating the "jewels" with which it is crowned. By reason of a bounteous supply of water, thus foretokened, a season of unusual activity is promised; but beyond this, and far more important, these severe snow blockades in the North have caused attention to be directed to this region as affording a safer route across the range into the valley of Salt Lake. A road passing through Jefferson, Gilpin, and Clear Creek counties (near Central City and Georgetown) would be over 100 miles south of the present line, and would unite with the California road at a saving of 200 miles in distance. The road under contract to be finished by June up the canon to this town may, in fact, become the pioneer of a through line, bringing this very remarkable mineral region in close proximity to a continuous thoroughfare between the Atlantic and the Pacific.

The summer is well in hand here in May, when commences a season of great activity. Although outdoor work is carried on throughout the winter, nearly all plans for new undertakings are postponed until early spring time. This is also the season for tourists, who, by reason of railroad facilities, visit this region in yearly increasing numbers to enjoy the wild magnificence or the mountain scenery, to examine the mines of gold and silver, or perhaps to partake of the health-giving qualities of the hot soda springs at Idaho, the Saratoga of the mountains, five miles distant.

In this place we are in the apparent centre of a belt of gold and silver bearing veins, crossing the hills, or traversing their facades, as do the stripes on the back and sides of a zebra. The width here may be from 5 to 8 miles, running north and south indefinitely. Indeed, properly speaking, there is no way of sharply defining the direction or extent of this or other great mineral belts. In a general geological sense the eastern boundary of this belt is the eastern boundary of the gneissic and granitic rocks of the Rocky Mountains. The same may be said of the western boundary, beyond the range. Between these are many "belts." The rock in which all these lodes occur is that which carries the precious metals, with rare exceptions, the world over, being either granite or gneiss—in this district a complex mixture of both. Such is the country rock, a sure indication of existing *fissure veins*, promising the production of mineral indefinitely downwards. The gangue, within walls composed of this country rock, is most frequently quartz, assuming different appearances when differently mixed with interjected matter. This quartz rock crops out on the hill sides in white or coloured streaks, bunches, and ledges, appearing and disappearing, called by prospectors "the blossom rock," overlying the vein below and a part of it, which when gone down upon discloses auriferous iron and copper pyrites, zinc-blende, argentiferous galena, and the sulphuret of silver, more than one always, and frequently all of them, in intimate admixture.

"Upon this rock" orators and writers are wont to aver such a dynasty, nation, or enterprise struck and went to ruin. Not figuratively but actually "upon this rock" the early fortunes of Colorado were most grievously injured, and well nigh ruined. Early discoveries were made of blossom rock decomposed during countless ages, which decomposition penetrated the vein to various depths. In this matter the gold was set free. The production was large, and the machinery the well-known stamp-mill. Mine owners and sharp speculators went East, with abundant proofs of rich and profitable enterprises. Companies were speedily organised, nearly 200 of them, with a share capital exceeding $150,000,000, almost all of these for Gilpin county alone, and chiefly organised in New York. Several millions were expended in the purchase and transportation of machinery, in the erection of works, and in various extravagancies of agents, as though success was assured. It was quite otherwise. This free gold, decomposed vein matter, was soon exhausted, and the virgin vein rock reached—solid iron and copper pyrites, or interspersed throughout the vein rock—quartz, porphyry, syenite, and gneissic intermixtures. Now there was no decomposition to free the gold, and consequently little or no free gold. Productive mines suddenly failed, though no lacking of ore. This disaster was unthought of, and beyond present remedy. Nearly all the companies failed outright, or became disgusted. A few halted long enough to incur debts in experimenting on processes, the invention mostly of some sharp, enthusiastic, but ill-informed adventurers in the field of metallurgy. None of these devices were successful, though costing millions in the aggregate, and, unfortunately for the country, giving a bad reputation to the ores, as being "intractable," "refractory," "rebellious."

Here was a dilemma of a most serious character, for which there seemed no relief, nor was there until 1868, when smelting-works were put in operation. Hitherto all the ore raised from the mine, however rich in solid iron and copper pyrites, was sent to the mill. Now what could be hand-selected out had a market at the smelting-works. This originated a selection of ore into first-class, or smelting ore; and second-class, or mill ore. The benefit is but partial, and has been the cause of infinite loss to the country, whilst demonstrating at least one way of treating the ores. The evil of the system consisted in the encouragement given to keep up the milling system on the second class ores, which, in fact, contained interspersed from 15 to 50 per cent. of first-class ore connected with the gangue. Hence, the mill could only succeed in extracting a percentage of the gold, losing *all* of the sulphuret of silver, and all of the copper yet contained in these sulphurets. This loss of gold, silver, and copper is seldom less than 60 per cent., and often more. The mills erected by the companies, being idle, were rented for the reduction of this second-class ore. The mines unused by companies were leased by miners without capital, and thus two classes of men were soon educated to continue a business slightly profitable to themselves, but very injurious to the reputation of the mines. In this way, however, mining affairs have jogged along since 1868, the profits increasing somewhat by increase of skill, better machinery, and a more thorough system of working. The loss on the average of ore raised is not less than 40 per cent. under the best conditions, a waste quite too large for a healthy progress in any industrial pursuit.

From the mines of Gilpin county alone nearly 600 tons of ore are produced daily, or a total of 180,000 tons annually. Between 400 and 500 lodes have been assayed or mapped, all within a circle of three miles in diameter. Fully 1000 lodes have been recorded, upon which more or less work has been performed. From 15 to 20 miles of reputable lodes are known to exist within this circle, upon which there is not less than eight miles of shafts, the deepest 800 ft. There is not less than 20 miles of drifting on these veins, following the ore deposits in the crevices. The territorial assayer has tested thousands of samples from these leads. An average of 300 of these tests, samples of mill ore taken in course of daily operation, show this species of ore to run largely over $30 per ton in gold and silver. The average of first-class ore reaches $130 per ton in gold and silver, and about $20 in copper, of which no record is made by the assayer. There are 83 stamp-mills in the county, 135 engines in place, 4367-horse power, and 1597 stamps, of which there are over 800 in use, requiring 1703-horse power. There are 39 engines used at the shafts of mines for raising ore from the veins and keeping them free of water.

The city of Black Hawk, just down the gulch, has a population of 1800. The business directory contains 180 names, classified under 40 different avocations, comprising all the trades and professions essential to the movement of a business community. Here, in Central, 225 names are classified under 38 professions, trades, and occupations. Five demoninations have church buildings. The Masons, Odd Fellows, and Sons of Temperance have lodges. There is a Mechanics' and Miners' Institute, a handsome and commodious public school building, and hotels in abundance, a large brick structure being now in course of rapid completion. Central City has a population of over 3000. Further up the gulch lies Nevada, strictly a mining town, of some 1500 inhabitants, and surrounded with mines, many actively worked, and never relieved from the busy hum and clatter of steam-mill machinery. The product of Colorado mines for—

	1870.	1871.
Shipped by express	$2,160,000	$2,820,000
By private hands	120,000	120,000
Shipment in matt	884,000	923,000
Shipment in ore	286,000	500,000
Southern mines	160,000	130,000
Northern mines	50,000	50,000
Used by manufacturers	75,000	100,000
Total	$3,675,000	$4,643,000

This report has the sanction of the United States Commissioner of Mining Statistics, a Government officer. Fully two-thirds of this production was yielded by mines and through mills and furnaces in this county of Gilpin.—*Central City, April* 10. B.

MINING IN COLORADO TERRITORY.

SIR,—In my last communication I stated that the Bobtail tunnel, or rather the adit level to the Bobtail Mine, had intersected the Fisk lode. I have now the pleasure of informing you that the lode at the depth of this level, which is from 100 to 150 feet below the deepest shaft, is greatly improved in value, and is from 5 to 6 feet wide, easy for exploring, and yielding on an average 10 ozs. of gold to the cord, or a little over 1 oz. to the ton. This mine is all leased out to working men, and is paying them well, and will pay them much better as soon as they communicate these shafts with the drift, which is being done with all possible dispatch. There is yet about 600 ft. to reach the Bobtail lode, which will take nine or ten months to complete, and when done will give a great many men employment in this and the mines adjoining it, and will leave good profits to the shareholders if properly managed, and especially if more smelting-works were put up, as the price charged for smelting by the Colorado and Boston Company is quite out of reason, the price for gold ores being from $35 to $40 per ton, besides the value of the copper and baser metals,—and silver, unless it amount to over 10 ozs. to the ton. This is much too high, and I do not see any remedy, unless we have more works put up that will give competition, which we hope to see this summer, as there is a party from here now in London in order to get up a company, with a capital of $500,000; $400,000 to be raised in England, and $100,000 here in this place, a large portion of which has already been paid into the bank by the working men of this place. I would strongly advise all my friends at home that have capital to invest to take an interest in this undertaking, and place it in the hands of practical and honest men; these men should be sent from England, and should be well acquainted with their work in all its part, and then it will be a profitable investment to the company, and a boon to the mining community of this country. If this company is completed I trust the management will be careful in selecting the men to conduct the business in a proper manner, and not send out men here who know nothing of their business, as some mining companies have done, and who ere long will find their mistake. Their money will all be uselessly expended—in fact, their money be spent in the formation of unavailable works, and the employment of servants who are quite valueless to them and every other person, indeed, besides the hotel keepers. These mines and parties I shall write you more fully on, and I trust the companies in England will be more careful in the selection of their servants in future, as it is bringing an evil report on the mines of the country they do not deserve. What would the mining men of England say to their agent if he were to drive an adit level for 400 or 500 feet by the side of a lode, and only a few feet from it, and paying from 10*l.* to 12*l.* per fathom, when the level could be driven on the course of the lode, proving its value as developed, for one-half the cost? and also sinking two shafts at a cost of 15*l.* to 20*l.* per fathom within a few feet of each other. This, Sir, is being done by agents sent out by English companies, by whom the mines are owned. Such workings as these are a disgrace to any practical miner, and cause ruin to the shareholders—which I hope you will try to avoid by publishing the fact through your valuable *Mining Journal*. H. B. GROSE.

Central City, April 8.

OUR MINERAL RESOURCES—THEIR IMPORTANCE.

SIR,—"I am neither a prophet, nor the son of a prophet," but I ventured to predict certain matters in your Journal years ago which have invariably come to pass. In truth, every man is a prophet who speaks or writes on any subject which he thoroughly knows. The metaphysicians were right when they invented the co-relative phrases, "invariable antecedence" and "invariable sequence." So long ago as September, 1867 (nearly five years ago), I wrote these words, which you printed in your issue of Sept. 7 of that year:—"Seasons of depression ought not to daunt the spirit of enterprise, nor depress the sanguine into the despairing. Business of every kind must fluctuate with the influence of social and political occurrences, with the discoveries of science, of new material of commerce, and new regions of development, The value of British tin and copper is likely to rise in the British market, for, whatever the importations of these metals, there will of necessity be a demand for the productions of British mines. The late season of depression has not been the only one known in our times, and as former periods of reverse were succeeded by others of highly favourable reaction, so it will be, and the flow will be seen where the ebb so lately left its trace." Sir, I am sure you and every reader of your invaluable Journal will see at a glance the truthfulness of this forecast. A little later, on writing of the copper market, and pointing out the fact that from 1838 to 1852 the copper standard was lower than for 14 years previous to the former date, and 14 years after the latter, I made these observations:—"These periods of revulsion and reaction must come, and it is the investor's duty to expect the like, and to remember that mines are solid investments, which always yield valuable products, unlike the perishable commodities in which commerce so extensively deals." It will not be too bold or exacting of me to ask for a hearing once more on a subject of which my predictions were so strikingly correct. At the very worst of times I saw circumstances and phenomena which portended a flood tide of prosperity, which now happily overflows.

During the years 1867, 1868, and 1869, when the mining interest of Cornwall was very low, and poverty prevailed quite unparalleled in the history of Cornish mining, I called attention, through the Journal, to the *modus operandi* in both Cornish and Devon mines; unhappily, as was my duty, censuring it in several respects, and at the same time recommending changes conducive to more profitable working. I called for your notice and that of your readers to the imperfect mode of sinking shafts then prevailing, and also to the clumsy and inadequate way in which levels, especially main levels, were driven. These things are better now, but they are very far away from being what is required; and you will, Sir, support me in saying that unless shafts be sunk to the proper depth, and clear and complete, and unless levels, especially main levels, are driven home of the proper width, and thorough workmanship, the operations of any mine, especially mines for the superior metals, cannot be effectually, and may not be at all profitably, wrought. All mines should have a shaft, or shafts, of a given size, made as perfect as engineering science will admit; and a main level, or several levels of certain dimensions, should be carried out in a manner showing that the engineer had thoroughly conceived the nature and extent of the property, the true character of its bearings, and whither to direct his operations.

The effect of conforming to these principles *ab initio* is great and determinate, and possibly, and most probably, will decide the fate of the enterprise. It may be, Sir, some of your readers will be startled at the expression of an opinion that all individual mines in lease have been worked and re-worked five or six times over before they have become really profitable. To what conclusion, then, does this fact lead? Does it not proclaim, as if with the blast of a trumpet, that there is something wrong *in limine* in the customary procedure in our two great mining counties, and that it is high time we should be able to work out a piece of country at once, so that the speculations should always assume the aspect of a certainty? It is important, also, for the adventurers to remember that gold, silver, tin, copper, lead, zinc, iron, coal, &c., do not go out of fashion as textile and other materials do; and that, therefore, if the mine get fair play, in the long run the investor will get fair play.

Sir, I am sure I shall have your countenance in expressing the opinion that the time has arrived for pressing these views upon the judgment of the mining community. Never in the history of our country—never in the history of any country—was there such a vast trade as during the last year and a half has prevailed, and the marvellous development of the traffic in metals and minerals has lain at the basis of it all.

A paper, which in the City is a great authority on monetary affairs, in a recent issue, observed—The cotton manufacture is no longer our staple trade, neither is any other textile fabric, nor all the textiles taken together. Our mineral resources are the great foundations of our industry. We give the substance of our contemporary's remarks, not *in extenso*, because of its length. Well, this is so. Not a wheel whirls in Lancashire or Yorkshire; not a hammer or anvil resounds in Birmingham or Sheffield; not a spindle glistens round in Belfast, Dundee, or Nottingham; not an imprimis is placed on cloth at Bury, Bolton, Salford, Blackburn, or Glasgow, without the aid, immediate, direct, and indispensible of metals. The steam-engine is iron, steel, tin, and copper; the reed belongs to the last metal. Tin vessels contain the oil and dressings, and all those circumvalved pipes are lead—in the wonderful manufactories of Manchester and Leeds.

Our export trade is the wonder of the world, so is our import trade, which wherever we import is chiefly borne in British bottoms. The ships now are iron; the forest has given way to the mine; hearts of steel—not as the old song says, "Hearts of oak are our ships, hearts of oak are our men"—and we could not trust our iron bottoms without copper; so that is as essential as the other to our carrying trade. We make all our manufactures with metal machinery, and send it all away in metal-built ships. Nor does the power of the mine stop there, for the steam, which is the grand motive power, is generated from the mine both on sea and shore, and thus metals and minerals make and keep an affinity and co-operation of altogether resistless and wonderful power.

I will not in this letter go down into particulars, arranging *data* and figures, I will now only deal in general facts and principles; but having the favour of your columns, I undertake to show from the trade of last year, and the expired portion of this year, that metals and minerals are the grand staples of our trade directly, and that indirectly but immediately they constitute a *sine qua non*. The year 1871 was the most wonderful one known for the trade in metals. Our imports were great as well as our exports. In iron this was so because our furnaces must have been blown out had we trusted to the supply of ore raised in Great Britain; and from some inconceivable cause the vast resources of Ireland, where the very best iron in the whole world is produced, are unworked. The import of Straits tin would not have existed if it were not wanted, and every ton of it called for a proportionate quantity of Cornish. If we import copper from Chili or Wallaroo we send it away again in another form, having expended upon it highly remunerative labour.

If we work our mines intelligently and efficiently our resources are vast, and no conceivable enterprises can possibly reward so munificently the capitalist as British mines. Relying upon your courtesy, I will furnish you some *data* in another letter proving the vastness and fundamental character of our trade in metals, and the course which should be pursued in extracting them from their deposits. THOMAS SPARGO.

Gresham House, Old Broad-street, May 2.

MINE LEASES.

SIR,—There are evils connected with leases to which I would draw the attention of your readers, and that of the parties concerned.

1.—There is the charge made by the lord's solicitor for the deed. Thirty years ago, when the stamps affixed to the deed and its counterpart were about 7*l.*, the charge for the deed was about 20 guineas. Now that the stamps cost a few shillings only, the charge is 25 or 30 guineas! in some cases more. This reminds me of another fact—that when the duty on leather was remitted, the shoemakers advanced the price of shoes and boots! The remissions of duties, in many cases intended for the public good, are absorbed by dealers. Twenty guineas was too much for a mine lease when the stamps were high. At present 10 guineas, or even less, would be ample for a mine lease. I should be glad to draw it at half that price. The landowners should insist that the charge should not exceed a given sum, thereby putting a check on the rapacity of the lawyers, who are too grasping, as we all know.

2.—The charge for land taken for mining purposes is too high. 100*l.* per acre is paid for land not worth half that price, and when paid for so dearly it does not become the property of the lessees only during their tenancy. In many cases the land is not destroyed, or only in part. I think it but fair that the part not destroyed nor injured should be taken back by the lord, and repaid for by him at the rate charged. I admit that land destroyed—irreclaimably so—should be paid for, unless the dues received by the lord do not cover the value, but not otherwise. Where the dues or "rent" cover the value of the land, nothing more should be paid for it. The adventurers lay out their money really for the lord's benefit, as well as their own; and the lord's benefit is certain, while that of the adventurers is contingent. The lords should act more liberally than they have been wont to do. No dues should be paid before the cost has been met by the minerals raised. The charge of what is called "minimum rent" is most unreasonable. The conduct of the Crown officers in relation to the Manx Mine I consider to be most illiberal, if not disgraceful.—*April* 27. A LESSEE.

"INNS" IN CORNWALL.

SIR,—Those who have travelled, like I have, through the mining and other rural districts must have met with amusing, if not disagreeable, experience in seeking but not finding convenient hotel accommodation. Every inkeeper is a *licensed victualler*, which implies that he is prepared with victuals and other requirements for man and beast. In very many of such houses the keepers are prepared in no such way. Proper food, which is the most essential thing for both, they have not: or not of the proper sort for man, I will give you one specimen out of many cases which have occurred to me. Having occasion to go with two assistants to do some work in a church village, about five miles from Helston, we called at the village public-house or inn to dine. The hostess said, "What would you like, Sir?" "A beef-steak," I replied.—"We have no beef in the house." "Then, we will have ham and eggs, if you please."—"We have no ham or eggs," says she. "Then, let us have some bacon."—"We have none," says the hostess. "Then why did you ask me '*What* I would have?' What have you, then?"—"Bread and cheese, Sir." Off bread and cheese, therefore, we had to dine, or go with empty stomachs. An assistant of mine had to stay a fortnight in Leland mining district, at a similar "inn," where he could have no lodging, and his dinner nearly every day was off bread and cheese!

Bad as these cases are, I can give an instance still worse. A gentleman con-

nected with the mining interest was passing through East Cornwall, or Devon, I think, and called at an inn for refreshment. Questions and answers similar to those just quoted passed between the gentleman and the *landlady* (as Mrs. Boniface is called), and with this *finale*, "Then what have you in the house?" said he; "An execution, Sir!" was the reply.

Innkeepers who show such utter disregard to the wants of travellers should, after notice given and no amendment, be deprived of their licences. They appear to think that beer and spirituous liquors will serve all the necessities of the corporeal nature of man.—*Truro, April* 27. R. S.

THE FORTESCUE TIN MINE.

SIR,—Amongst the many prizes of 1872 we may safely rank this mine, which is situate in St. Stephens, near St. Austell. The discoveries of tin are most valuable in several of the lodes, of which there are eight in the sett, but the most remarkable is the late discovery of tin in a lode called the Great Caunter, which is 12 ft. wide, and valued at 400*l.* per fathom. The lode was discovered by the farmer's plough, which came into contact with a rock of tin of about 1 cwt. The miners have since sunk on the lode, and found it as described. I am not surprised that the shares are taken with avidity, the property being in the hands of a respectable party, for whom Mr. A. P. Barr is secretary *pro tem.* The selection of the site is due to the discernment of Mr. J. Harris-James, C.E., who has several other mines adjacent—all of a productive character. St. Stephens (being east of Truro Bridge) has been neglected by speculators, who preferred to spend their money where mines are thicker, as in the Camborne and Illogan district, but the locality of the Fortescue Mine is as good as the best district that can be named, for it embraces the celebrated Polgooth and Hewas Mines, which yielded immense profits. Most of the tin mines in Cornwall were discovered by "backing" the lodes, as in this mine. In the Camborne and Illogan district they afterwards yielded copper in abundance, and now tin in abundance. I saw to-day a stone from the caunter lode, which is of rich quality.—*Truro, April* 30. R. SYMONS.

THE CIRCULAR NUISANCE.

SIR,—This would soon be put down if the recipients either took no notice of them, or in certain cases acted just the contrary to their advice; for instance, about a year ago I received a Circular advising me to buy shares in a tin mine in West Cornwall, at 2*l.* each, as they would soon go to 3*l.* at least. Having a few shares in the mine, I sold them at once for considerably less than 2*l.* In a month they fell to 1*l.*, and have stood at about that price ever since.

ADVENTURER.

"CIRCULAR MINING"—THE TERRAS MINE.

SIR,—Under this head your correspondent, Mr. Royle, draws a very erroneous conclusion from the facts he mentions. Everyone will agree with him as to the evils and nuisance of the Circular Mining—the "bull" party; but the evils from the "bears," as shown in the Journal, are quite as great. And as it turns out, the authors of these "bull" circulars are not so far beyond the mark in quoting the value at 3*l.* 10s. to 4*l.* 15s., as the "bears" are in valuing the shares at 25s., for I bought at 50s.—which I have only got a partial delivery of—and they have been since sold in London by a most respectable broker at 3*l.*

Mr. Royle may congratulate himself upon his fortunate purchase of Terras at 25s. 6d., which only proves that the party of whom he bought did not know the market value, and it would have been very much better for his clients had the solicitor adopted the usual course and sold through a dealer or broker. At the very time he sold none were offered under 40s. to 45s., and, as I have before said, shares were then bought at 50s., and now 60s.; and by mere oversight an offer of 40s. was not made to the solicitor selling, so that Mr. Royle has made a most fortunate hit.

In my last letter the printer has made a mistake. I wrote the "elvans" had yielded about 10 tons of tin—the printer makes it twice the "halvans;" the latter means from *wastes*—the former is a distinct course of ore-bearing minerals.

ONE THOUSAND SHARES.

"CIRCULAR MINING"— ——— MINE.

SIR,—I am glad to see that the public have at length awakened to the evils of what is mildly called the "Circular Nuisance," but I fear it deserves a more condemnatory designation; and in this I am sure your readers will agree when I have told my experience of the system. Some time ago I received a Circular from a firm in Beaufort-buildings, Strand, in which the above mine was written up as a first-class investment, offering the original 1*l.* shares for 4*l.* 10s., stating that these shares were sure to go to 15*l.* within one month. On communication with these gentlemen, they were very enthusiastic about the mine, and I (unfortunately without taking the advice of my own stockbroker) closed with them for half-a-dozen shares at the price. In a short time I received another Circular from the same firm; this time they had raised their price to 5*l.* 10s. I consequently instructed my broker to sell at that price; but to my great disappointment found the shares unsaleable at any price, and I suppose worthless, as I have never received an offer for them since, though I have put them into the hands of many agents. This month I received a circular from another firm, in Coleman-street, recommending the same shares at 4½ to the unspeculative as permanent securities. Do the above mentioned firms consider themselves justified in taking 4½ for shares that the unfortunate purchaser will find unsaleable even at par? Is there no law to punish a man who sells an article worthless, or nearly so, to an innocent person at a high price, representing it to be worth that price. Does it not come under the Statute of Frauds? If not, the sooner the public present a petition to Government for special legislation the better for the mining interest, and for honest men who earn their money hard, and object to being fleeced by mining agents; not that I for a moment impute any dishonest motives whatever to the gentlemen whom I have mentioned, but merely state facts as they occurred to warn those who intend investing not to be satisfied with Circular prices, as five minutes perusal of your valuable Journal may save them paying 500 per cent. above the value of the shares of many young mines. I am sure the public are much indebted to you, Sir, for exposing this pernicious system, and if you would lend your able assistance to petition Government to put an end to it, there would still further be reason to thank you.

April 29. A VICTIM TO MISPLACED CONFIDENCE.

WHEAL BULLER.

SIR,—The purport of the anonymous writer in last week's *Mining Journal*, in contorting facts and suggesting falsehood by suppressing truth, is so palpable and transparent, that the most obtuse can easily divine the object. As an example to my anonymous friend I would exhort him to throw off his mask, for there are only two reasons which can possibly induce anyone thus to shelter his assertions—either for some reason best known to himself he has ground for being ashamed of his name, or he well knows that what he has put forward is without foundation.

During the many years I have corresponded with the Journal, I have never so far forgotten my duty to the public as to attempt to mislead by groundless statements—a fact to which "Senex" would appear to be a total stranger. Hence I will not condescend to further notice this irresponsible emanation, save to say that if "Senex" will emerge from his shell I shall have much pleasure in replying to his communication. FREDK. WM. MANSELL.

Pinners Hall, Old Broad street.

ERGLODD AND PENPOMPREN MINES.

SIR,—Captain Absalom Francis, with his usual courtesy and urbanity (pleading superior experience, and, I suppose, intelligence, in Cardiganshire, to that of his colleague, Mr. Thos. L. Cottingham, on whose behalf he, therefore, writes), enumerates a list of mines which, he says, give a higher yield than 25 ozs. of silver per ton. I will select but four out of the 11 mines, and will simply ask Capt. Francis why, if as he states Glog-Fach, Goginan, Cwm Erfin, and East Darren yield from the bulk from 28 ozs. to 32 ozs. of silver, the lead sales from these mines, as quoted in the *Mining Journal*, only range from about 15*l.* to 17*l.* per ton? any why, if Erglodd and Penpompren ore produces from 15 ozs. to 50 ozs. per ton, the average price of about 14*l.* 10s. was only obtained? Surely, if a non-silver yielding lead ore is worth a nominal price of (say) 12*l.* per ton, a produce of from 28 ozs. to 32 ozs. of silver in the one case, and of from 15 ozs. to 50 ozs. in the other, ought to realise more than these quotations. As Captain Francis places such implicit confidence in the veracity of the letter said to have been written by "A near Relative of the late Dr. Hobson," perhaps he is in a position to furnish the real name and address of its author.

I omitted to state in my last letter to the Journal that the books of the mine further prove that out of the 571 tons of lead, from which it is asserted Doctor Hobson acquired his "handsome income" (he lost as I have shown 6 06*l.* 10s. 4d.), only about 330 tons were obtained from the Erglodd and Penpompren setts, the remainder being produced from another and distinct grant, now belonging to Mr. J. M. Davis, lessor of the former. EDWARD GLEDHILL.

Mining Offices, Shrewsbury.

PENBERTHY CROFTS MINE.

SIR,—The remarks of "Home and Foreign Miner" in your valuable Journal of Saturday, April 27, on these mines calls to my mind very plainly what I have witnessed here—the opinion entertained of the property, and the results that most assuredly will follow a fair development of the mineral-producing lodes. These mines, when first worked by the Messrs. Gundry, were immensely rich, principally for copper, more particularly on the main, caunter, and King's lodes. Kistal they worked to the depth of 45 fms. on a lode from 12 to 18 ft. wide, rich for copper on the back, but at the bottom it came into tin, and its value can be best judged when it is known that nearly all the rubbish left on the surface has since been taken away and returned for tin ores. Wheal Fowey, on the east, is only sunk to the depth of from 50 to 60 fms. below a shallow adit, which was a rich tin mine, and would have since been worked by local parties if they could have started capital to work the whole run of mines. A capital of 30,000*l.*, to carry out the whole extensively, is more than can be at all times got in Cornwall for mining.

After this run of mines ceased working by the before-named firm, it was again started by the late Capt. John Davey, who was the most successful mine manager in Cornwall at the time, having discovered at least 16 rich mines successively. Capt. Davey sunk the engine-shaft here, which is near the centre of the sett, to the depth of 110 fms., of which 90 fms. is perpendicular—a splendid engine-shaft; on this shaft was a most imperfect old steam 60-inch pumping-engine. It should, however, be understood that although the mine here is to the 110 fm. level, other parts will not average 50 fms. deep, and consequently a very shallow run of mines. During Capt. Davey's operations, which is about 50 years since, considerable quantities of mineral were also sold, chiefly copper, and some tin. I believe there were two or three water stamps kept going in the neighbourhood on it, and also one at Wheal Fancy; but there was never any steam-stamps employed on these mines, and the water to be obtained for such purposes has always been little. The ores and deads had all to be drawn to surface by horses when steam-power should have been employed; more imperfect machinery could scarcely be seen at any mine, and in that day the necessary capital could not be raised to provide better. These mines at the time were unquestionably coming into tin throughout, and although Capt. Davey was obliged to abandon under such circumstances, he last reported that with a proper outlay in machinery it would become a great run of tin-producing mines that would pay well, in addition to the good returns of copper that would yet be made.

In the bottom of the engine-shaft, I was informed by a man who worked there, the lode was large and good, and improving in depth when abandoned, but for eight months of the year they could not touch it, the water preventing their operations at the bottom level. There is no doubt when these mines are again drained, and I hope to see the day when it will be done, that plenty of tin and copper can be raised in the upper levels as well as at the bottom. Most of the tin-bearing parts of the lodes are untouched, from which great returns will commence at the 18 fm. level. Capt. T. Richards, of Bank House, Redruth, some 30 years since, intended to have worked these mines, and he drained the water to the 40 fm. level, at which point he drove a cross-cut, and cut a new lode rich for copper; but before much could be done on it their machinery (only a water-wheel) broke down, and that company, for want of means, had to abandon it, leaving behind them a rich course of ore newly discovered, in addition to the other very important lodes I have alluded to. Capt. Richards speaks highly of this property up to the present. Only about three months since he stated to a party at St. Ives Road Station that this and Wheal Speed were the best mining setts in the district, and his practical knowledge of the neighbourhood is well known, having been connected with most of the mines in it.

I shall be glad to learn that some able company has secured these mines, believing that, without an exception, they are the best that have been opened for many years in this part of West Cornwall, and this opinion is shared in by the most respectable mining men in the county. AN OLD MINER.

May 1.

VAN CONSOLS—"TIME ON BARGAINS."

SIR,—"Alpha" in last week's Journal is not justified in saying that I was quite wrong relative to the Committee of the Stock Exchange not recognizing "Time on Bargains" beyond the current account. His insignificant quibble of the clerical omission of the "eight days" does not do away with the fact that such a rule is in force. Respecting his protest, I still question the legality of share dealers advertising shares for "time on" who do not possess the shares, and the only honest conclusion that can be arrived at is that the one object in view is to depreciate the market value and replace shares already sold. In reply to Mr. Rosewarne's advertisement, the very fact of practically experiencing "myself" the pat evil effects of contracting "Time on Bargains" caused me to come forward to depreciate the pernicious system for the future. W. WARD.

Stock Exchange, May 3.

MINING IN IRELAND.

SIR,—If you will permit me to make two or three remarks I shall close my short correspondence in reference to Glandore Mine?

How many tons of copper ore were shipped, and what was its value per ton? The 600 tons—was it manganese or iron ore, or both in one? What did it realise? If the mine is so rich, why stop it? The late Capt. Thomas Tonkin made a fortune by the manganese at Glandore, but when it became irony and valueless he was too sensible a man to work at a loss, and he, therefore, ceased all operations many years before the American War. I still doubt if iron ore or manganese will be found in paying quantities in Glandore. It is not the right district for copper ore.—*April* 27. YOUR CORRESPONDENT.

MINERS' EMIGRATION.

SIR,—When I arrived at Redruth railway station, yesterday, I found a crowd of persons standing by it. I said to one of them, "What is the occasion of this large assembly?" The reply was, "Oh, it is only to witness the departure of miners who are going abroad." I said, "I dare say that many more would go if they had the means." "Yes," said my informant, "15 out of 20 of the men here present." England is a sort of nursery for colonising the United States and other foreign lands. Miners, of course, will, and should, do the best they can for their own interests, but I am sorry to see the best of our miners leaving us on account of their dissatisfaction with the wages paid them, and that at a time when men will be required in great numbers to work the many mines now starting. My belief is that most of the emigrants will repent of the exchange. Their removal is a questionable policy.—*April* 30. R. S.

ST. JOHN DEL REY MINING COMPANY.

SIR,—It will be very convenient to various shareholders if the directors will promptly and plainly state their intentions as regards the proposed call. From a formal notice advertised in the *Times* of April 29, it appears that the debentures issued in January are to be called in, and that their amounts "will be accepted in payment of calls made upon the shareholders, and payable prior to October 31, 1872." Those debentures ought never to have been issued, as they added, for what at least looked like individual accommodation, a burden needless and hard to be borne in the company's present calamitous condition. The next best thing, however, to not making a false step is to retrace it as soon as possible, and if the directors will now terminate the existing uncertainty, and announce without delay the particulars of the pending call, they will oblige many in my position.—*May* 1. A SHAREHOLDER.

"WHAT TO SELECT—WHAT TO AVOID"—No. XIX.

SIR,—In an interesting scientific discussion which has been going on for some time past in the Journal upon the relative mineralogical value of what are known as "true fissure veins" and ore deposits found in the limestone formation, the commercial view of the question appears to have been entirely ignored, although one in which the English mining public have a most vital concern, as some millions of English capital is now invested in mines that are being wrought in the limestone formation—for instance, Emma, Flagstaff, Richmond Consolidated, Camp Floyd, Last Chance, Eberhardt and Aurora, South Aurora, and Utah, representing an enormous amount of capital, not less than 2,425,000*l.*, are all mountain limestone mines.

It is not my province, nor is it my intention, to attempt to express any opinion in regard to this much-vexed question; but from a commercial or investor's point of view one is naturally led to enquire which description of mines have yielded upon an average the most profitable results? I am perfectly aware that I am treading upon most dangerous ground, and that there are many solid arguments controverting the facts I am about to adduce; but, knowing from the extent of the correspondence I am continually receiving, a considerable amount of misapprehension exists among the shareholders in the above-named companies upon this highly important subject. I have put myself to a considerable amount of cost and trouble to obtain a few leading facts in connection with the respective districts in which the greater number of the American mines now before the public are situated, and the result of my enquiries fully justifies me in endorsing the statements of Prof. Clayton, who, it will be remembered, was recently chosen by the Eberhardt Company as the most competent, reliable, and experienced authority upon this especial description of mines, and whose word, it is admitted on all hands, is above suspicion and without reproach.

Prof. Clayton says—

"True fissure veins are as barren of ore as any other class of deposits—in fact, so far as my own observation has enabled me to judge, the true fissure veins, carrying rich deposits of ore, are exceptional. The most productive mines in the Pacific States (if not the world) are 'contact' veins, bed veins, and irregular deposits in particular zones of country rocks, forming 'stock rock'—that is, ore clusters or groups."

There can be no doubt that, at least as far as the Utah Territory is concerned, the production of silver will in a few years hence be limited only by the facilities for reducing argentiferous ores.

It is to be hoped that the return of silver bullion will not have the same effect as it did upon old Spain—producing a rapid decline of the material prosperity of the States.

WHEAL BULLER.—The financial condition of this mine is in every respect satisfactory. A large amount of tutwork is being carried on, with every prospect of insuring a great success. The accounts presented to the meeting in Cornwall (which I attended) included the cost up to the end of February, as close as they possibly could be, seeing that the March cost was not then due. Under the old regime the shares were selling at about 12*l.*, the present price is 35*l.* to 37½*l.*, and are being absorbed by local holders. This is the most conclusive proof of the present as compared with the former position of the company.

NEW WHEAL LOVELL.—Since I first drew attention to this mine the shares been considerably advanced in market value. This result has taken place from the generally improving value of the mine; but, in addition to this, I have received from one of my agents in Cornwall the important announcement that "a considerable improvement has taken place in the 50 fm. level. The rich grey copper looking well, never better, and a splendid lode of tin in the bottom." The significance of this feature is, as I pointed out last week, in the fact that the same thing occurred, I believe, in Trumpet Consols, and also in East Lovell, before the rich deposits of tin were met with. New Lovell, although selling at less than 15,000*l.*, is working to a monthly profit; while Trumpet Consols is selling for 72,000*l.*, and East Lovell between 31,000*l.* and 32,000*l.* These are facts which the investing public should bear in mind.

SOUTH WHEAL KITTY.—I have known this mine for many years, having with others been interested in its development in 1864. The very low price of tin, notwithstanding the known value of the mine, caused the suspension of operations, although its prospects in every respect were everything that the most sanguine could desire—such, indeed, as to have led to the general confident expression of opinion from all trustworthy practical authorities that upon development it would prove equally productive to its neighbour, Wheal Kitty. It is sufficient to know that Capt. W. Teague has associated himself with the mine, and undertaken its active management, which he certainly would not have done were he not fully satisfied that there was a prosperous future before it.

Pinner's Hall, Old Broad-street. FREDK. WM. MANSELL.

[For remainder of Original Correspondence see to-day's Journal.]

Royal School of Mines, Jermyn Street.

[FROM NOTES BY OUR OWN REPORTER.]

LECTURE XXXV.—Having heretofore (said Mr. SMYTH) dwelt on various considerations connected with the sinking of the shafts and securing them, both against the breaking down of the sides and the incursions of water, there are a few intermediate points to review before we come to the actual winning of the material. As I mentioned to you in one of the earliest lectures, some of the matters connected with mining consist entirely of operations of a mechanical character; but in others, although mechanics cannot be dispensed with, a kind of experience is of great importance connected with the different ways the mineral to be won is placed in the vein or in the beds. It is, in fact, in this part of the subject that the difference is palpably shown when good judgment and experience are brought into play, and when they are absent the want of the latter always leads to expense and danger. Circumstances may be and generally are, to some extent, of the same character; but the mode of getting a deposit will be found to vary according to its thickness, hardness, softness, the way in which its structure is made up, the depth at which it occurs, and more particularly the character of the planes which bound it—that is to say, the hanging and the footwalls, the roof and the floor. From this enumeration it is obvious that there is great scope as to different modes of working with facility and economy. Another question of importance is whether the whole or a part of the deposit is to be extracted. In a great number of seams of coal the whole, from the floor to the roof, may be removed for sale, excepting, of course, the "smalls;" but a very different state of things prevails in metallic mines, and notably in the case of those metals which are disseminated in the vein stuff, and are of much intrinsic value, and which often admit of a selection underground of the valuable portions, the remainder being left behind, and not raised to the surface at all. It will be convenient if we arrange the rules to be observed into different groups:—

1.—The workings must be so arranged as to keep them clear of water. This would seem an obvious and universal duty, but you will find very frequently in mines on a small scale that it is lamentably neglected. Thus, when they find the ore is going down the men are apt to remove that which looks the best, without reference to the future, and to cut it away in strokes, trusting to remove the water by manual labour; but the difficulty of raising the ore and the water increases with every foot they go down. The shaft may only be a windlass shaft, and if it has to be sunk lower the men will have to work in the water. The consequences are so well known that getting ore in this way is termed "dragging it out by the hair of the head." It is often a short-sighted and expensive expedient, as the greater part of the value of the mineral is consumed by the expenses of raising the water and ore, to say nothing of the cost of delays which happen whenever the water comes in in larger quantities than usual by a feeder being cut, and everything is interrupted for the time being. After what has been said already, it is hardly necessary to add that the proper mode of dealing with even these small deposits is to sink the shaft at first to a proper depth, and then to drive levels underneath the orey ground, which may then be removed by one or other of the different systems in use.

2.—The shafts and levels must be arranged in such a manner as to make the carriage or transport of the ore economical. If the works are badly kept, or a large portion is open at one time at a place where there are no convenient means of access to the shaft, such proceedings may interfere seriously with any remuneration being obtained. This is more obvious in a colliery than in a metalliferous mine, but it is obvious enough in both, insomuch that the rate of transport underground is immensely higher than at the surface. This consideration makes it important to improve and shorten the routes as much as possible.

3.—The ventilation of the working places must be carried forward as perfectly as possible, both with the view to the saving of time, to economy, and to prevent danger to the health and the lives of the workmen. For instance, if we take the case of a level 150 fms. from the surface, driven very much in advance of the other levels, which is often the case, the ventilation will be found to be extremely difficult to deal with so as to enable the men to work satisfactorily, and without injury to health. The natural remedy is to sink a winze or shaft to the nearest workings; or, in other cases, to mitigate the evil by procuring the use of a ventilating-machine. It is obvious that in a bad atmosphere the health of the workmen must suffer, and whenever a shot is fired there will be a great loss of time in waiting for the smoke to disperse, unless it is carried away by ventilation.

4.—The most important point in all mining operations is that preparatory or exploratory levels, both on the strike or the dip, should be carried on while the other portions are being worked out. When this is fairly done great lengths may be fairly opened in poor ground without being so serious a charge as they will be if not counterbalanced by profitable works in other parts of the mine. Take, for instance, a small mine with two shafts; if the manager has not a proper degree of prudence and forethought he will constantly find a great tendency to remove the ore, and to neglect the duty, and avoid the expense, of sinking other shafts and driving other levels. As soon as this neglect sets in the closing of the mine begins. It often requires as much courage as foresight, for it frequently happens that the manager will be sinking shafts and driving levels for years beforehand, until perhaps the good ground is nearly exhausted. If he does not do so, however, he will be obliged to fall back on the company or proprietors for fresh capital; and if all the ends are getting poor at once, no one will be induced to go on with such a mine. On the other hand, if exploratory levels have already been driven it will commonly happen that a fresh course of ore will have been discovered, or in any case, a more favourable appearance, with which the owner will gladly go on till something better is met with. This is a case which often occurs. When we hear of this "tut," or "dead work," is a case which often occurs. When we hear of this "tut," or "dead work," not being pushed on at times when the mine is doing tolerably well, we may be sure the owners are (though, perhaps, unwittingly) destroying their mine. Experienced captains of mines are perfectly aware when they are doing right in this respect, but it often happens that their hands are tied, and they are obliged by the owners to work the mine in a particular way. It is in consequence of this that many mines come to a stand-still, which when resumed by others will pay very well, and it not unfrequently happens that mines are abandoned, and resumed two or three times, each new attempt involving a great expenditure of capital to put them right again, which might have been saved if the mines had been worked from the first with a due consideration for the future. It is difficult to say what proportion the dead work should bear to the other. It will necessarily vary according to circumstances. In the mine Crovecœur, in Bohemia, the proportion of men cutting away is one-third, to two-thirds constantly employed in opening new ground, or dead work. Unless this had been done in the Levant Mine large tracts of dead ground would never have been passed though, and valuable masses of rich ore never obtained. These are facts that ought always to be kept in view.

5.—The working places should be so disposed that the largest possible number of workmen can be brought to bear on them at once without any crowding. Even if it were for ventilation only it is bad policy to crowd a limited portion of the works with too many men, who hinder and interfere with one another. This is a point sometimes very hard to manage in metalliferous mines, as if the mine happens to be poor, and in one part of the vein good ore be met with, the managers are too apt to crowd men into that part and get all they can from it.

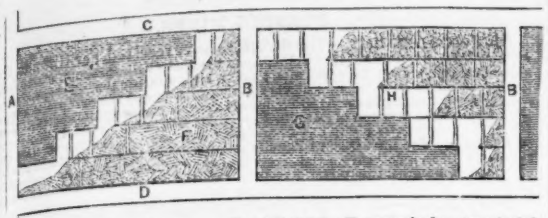
6.—Great endeavours should be made to extract the whole mineral without waste. In metalliferous mines this is best done by setting the ground on the system of "tribute," in which it is the interest of the men to prevent waste, and to examine the ground with care that none of the ore may get among the rubbish. In certain localities it would be absolutely necessary to leave valuable mineral behind for the safety of both men and mine. At the Levant Mine a case in point occurred. At a comparatively shallow level, far out under the sea, a great outcry was raised that the water was coming in. The captains proved beyond doubt that there was a considerable quantity of salt water going into the mine, but as this was an old and known "feeder," there were no fears for its immediate safety. The tin ore being in that part very good, but surrounded with hard and difficult rock, the miners had been allowed to work upwards, towards where there might be risk. It was determined not to go further in that direction, and the managers put in strong timbering to prevent any further settlement, and ceased to work in that particular spot. There is always risk where a vertical fissure occurs, and where by taking away the ground the crust between the miners and the sea becomes weakened, or where a lode is inclined at a considerable angle, and it is difficult to replace its excavated substance by built pillars. Although the lode may consist of good masses of ore it may be advisable to make some sacrifice by leaving arches of the unworked lode, rather than run the risk of the roof coming in. In stratified deposits where there is a bad roof it may seem wasteful to leave one or two feet of good coal as roof, but, balancing the expense of supporting that portion of the roof against the loss of coal by leaving it in the pit, the latter may be the most advantageous.

7.—Regard must be given to the settlements of ground at the surface, which damage or destroy buildings, perhaps villages or towns, produced large hollows, or let in the waters of canals, rivers, reservoirs, and even the sea and so occasion vast expenses for repairs and compensation, which may frequently be avoided or lessened by early remedial action. In cases of this kind either large masses of the mineral must be left as props, or replaced by artificial props of a permanent character. There are, however, many workings at which the material is removed from so great a depth that no damage to the surface need be apprehended.

In metalliferous mines the valuable material is worked away by stalls or stopes (German "*graden*"). We have already seen in slate and other quarries that the working places are arranged in a series of steps up the face of the deposit, the object being to employ as many men as possible, and a different set works upon each step without interfering with each other. This principle is applied to underground workings, where, however, the conditions are somewhat different. "Stoping," as it is called, is the usual mode of working lodes of moderate dimensions in Cornwall, Devon, Wales, the North of England, Saxony, part of Hartz, Bohemia, Spain, and elsewhere. The whole system, however, has greatly changed within the last century. Formerly, in all the best mines the system employed was that of "underhand stoping," or what used to be called by the Germans "strossenban." By it the deposit was attacked on its upper side, and the men worked downwards. More recently an arrangement the very reverse has been adopted in England, called "overhand stoping"—(firstenban, in German). At the outset in both, our first canon—that of keeping clear from water—must be kept in view. If underground-stoping is commenced at the bottom of the level, this canon would be violated, because the water would naturally find its way to the lowest point, and would have to be brought up by the windlass, as well as the material to be brought up. If ever such work as this is going on it is pretty certain that there is something wrong either with the managers or with the adventurers. The first thing to be done if the work is to be set about in the right way is to divide the ground by means of parallel levels driven from the engine-shaft into the lode, (say) at 10 fathoms asunder, as in Cornwall, which would give room for six or eight stopes. In the annexed diagram the portions E and G being drained by the levels, the miners, beginning to get E by overhand stoping, would take off a slice at the bottom, carefully supporting the material overhead with strong transverse timber and props; then they take slice No. 2, securing themselves as they proceed by further propping, and so on till the other level at C is reached. The process is repeated until the whole mass

is worked out. In working out G by underhand-stoping the miners would begin at C, and work down step by step to D. At each stage the ground overhead has to be supported by stemples, and the deads, or attle, is piled up on the stages and left behind. It is obvious that the latter is the less dangerous for the workmen, as in the former case they are continually liable to falls, and es-

OVERHAND. UNDERHAND.



[A, the drawing-shaft; B, sumps; C and D, levels; E, unworked orey material, supported by props; F, attle thrown down between the props; G, unworked material; H, props supporting the level above.]

pecially if the materials be of a flaky character. Overhand-stoping, however, is preferred in England, and is in general use, because the material as it is loosened falls by its own gravity down to the level; while in underhand-stoping it has to be thrown from one stope to another until it reaches the level, or has to be raised by windlass.

When the ore is of a friable texture, easily broken, and liable to be damaged if thrown about a shoot, or "pass," is frequently made in overhand-stoping, by which it is let gently down to the level, and the bottom of the shoot being raised, so as to admit a wagon beneath it, a sort of penstock is removed, and the wagons filled with great economy of time and labour. On the other side, in underhand stoping the material has to be lifted at a great expense, and the cost of timbering is greater. If we fairly and fully compare the two systems we shall find that overhand stoping is better as regards economy of working, consumption of timber, and the condition of the ore when got. There are, however, some advantages on the other side. When the country is apt to exhibit a striated structure, and the lines go across, the ground will be liable to come down, and it will be dangerous to work overhand without serious risk to the men. Again, when the ground is exceedingly hard, and the men find it desirable to use double-handed boring, this can scarcely be done, nor can very heavy hammers be used. In such cases it is certain that underhand stoping is the better plan. Again, if we are dealing with a vein of very rich intrinsic value; breaking down the lode on to loose rubbish will lead to the entire loss of a good deal of it. Even in a common lead lode the more brittle parts get mixed, and are lost. It is always bad to let the ores get mingled with the attle, even if regard is had only to the cost of separation afterwards. This is, however, met in some degree by spreading cloths for the reception of such valuable material. There is, besides, a risky appearance in overhand stoping, which has caused it to be greatly objected to in foreign countries, and in truth none but steady men should be employed in it, and proper precautions should never be neglected. In Spain they have adopted an important modification of the underhand system—that is to say, they open a "pass" into the level below, and so slide the ore down instead of raising it by windlass to the level above. On the other hand, in the North of England they open out the ground on both sides, so that if the distance between the levels be 15 fms. they go 7½ fms. each way from the rise.

By these methods lodes of ordinary width are extracted. If the ground be of a yielding nature extra precautions have to be taken; as, for instance, at the East Wheal Rose, where the material is very full of water, and the lode from 3 to 5 ft. in width, it is necessary to breast up the ground.

Meetings of Mining Companies.

SCOTTISH AUSTRALIAN MINING COMPANY.

A general meeting of shareholders was held at the London Tavern, on Monday, Mr. A. W. YOUNG, M.P., in the chair.

Mr. GRAINGER (secretary) read the notice convening the meeting.

The report of the directors, which was taken as read, stated that the total sales of coal by all the Newcastle collieries during the half-year ending at Dec. 31, amounted to 391,354 tons, as against 387,003 tons shipped during the corresponding six months of 1870, and 368,247 tons in the half-year ending on June 30 last. This company's sales amounted to 63,948 tons for the six months ending on December 31 last, as against 85,659 tons sold during the corresponding six months of 1870, and 67,692 tons in the half-year ending on June 30 last. This statement shows a falling off of the company's trade during the last six months, and a serious shortcoming when compared with that of any similar period since the Lambton Colliery has been in full operation. This reduction having taken place without any diminution in the general coal trade of New South Wales, and the inroad on the business of the company appearing to gain increased head as the half-year ending on December 31 last drew towards a close, the manager felt bound to seek to make good the position in the trade to which the company is entitled, having regard to the quality of coal which its colliery yields, the cost at which it can produce it, and the quantity it can send to market, by lowering the price (as the directors intimated in their last report he might be driven to do) from 8s. to 7s. 6d. per ton; and he contemplates, if necessary, a further reduction, with a view to checking or extinguishing the over-producing power, which, previously in comparative abeyance as regards this company, had, through his steadily adhering to the higher rate, seriously encroached upon its business.

There is no doubt that an undue number of collieries has been opened in the colony, and kept in operation, from the hope that has been entertained that by an artificial arrangement the price of coal, without regard to the relation of supply and demand, might be made remunerative to all collieries in existence there, whatever their position or circumstances; a state of matters that has for some time given a character of increasing insecurity to the position of even the most favourably situated of these collieries. The coal-producing power in the colony there can be no question is greatly in excess of the demand which exists for coal there at present, and it is really due to the manager of this company that such excess is not much greater than it is. It obviously must, therefore, be of vital importance to guard against the evil of an undue increase in production and in the number of competing collieries.

Supposing a fair adequate trade secured to Lambton and the other leading collieries with reference to their respective producing powers, the former can produce as good coal, and as cheaply, as the most favourably situated or circumstanced of its competitors, and, as a matter of course, more so than the less favoured of them. To maintain Lambton, however, in the position that thus belongs to it, it is necessary to follow out a course that involves the deriving only small immediate profit from it, for in seeking to regain that portion of its trade which by underselling and undue concessions has temporarily been withdrawn from it a low price may, for a time, have to be submitted to and accepted. The coal-producing powers of the leading and best situated collieries in the colony are alone quite equal to the entire present demand. The present producing power of Lambton Colliery is over 200,000 tons of coal per annum, and this power, if desired, can be increased.

The aim of the manager is to carry on the company's trade independently in a steady, honourable, business-like manner, producing good coal in the best possible condition, at the least cost that economy and careful management will enable him to do, and to charge as moderate a price for it as will attract to Lambton its fair share of the general trade; and when by such means he shall have drawn back to Lambton an extent of trade equal to its present producing power, then to be ready at once to raise the price. In the manager's last received letters he thus writes:—"Suppose it be possible, and that the price of coal is 'got up,' so as to make all existing collieries paying concerns, by making it remunerative (for a time) to work them to an extent much short of their producing capabilities."

After mature and deliberate consideration of all the present circumstances of the company, the directors have arrived at a similar conclusion, and they trust that the effort which it is necessary to continue will not be prolonged or difficult. The company have now to meet the question whether, having in their Lambton Colliery a permanent advantage over certain inferior and weaker collieries, they shall contest with them the possession of an adequate trade, in a manner that will secure to the company their rightful position in that respect. This action is obviously thrown upon the company, and it is, the directors consider, simply incumbent on them to pursue it as the only efficacious means of bringing about a healthy condition of the coal trade in the colony, and of placing Lambton Colliery permanently in the position of a profitable undertaking, resting on a solid basis.

The net profit realised from the colliery during the half-year ending Dec. 31 last amounts to 3302*l.* 13*s.* 8*d.* The profit of the company for that period, as shown by the general revenue account, is 2369*l.* 15*s.* 4*d.* The board, in view of the circumstances connected with the coal trade, already enlarged upon in this report, consider it their duty, acting in the best interest of the company, to recommend that this profit should not be divided, but be carried forward to the next half-year's account. They are convinced that this course will best conduce to the placing and maintaining of the Lambton Colliery in an enduring position as a remunerative undertaking; and they confidently rely upon the support of the shareholders in carrying into effect the necessary measures to that end. Until a dividend shall be paid to the shareholders the directors will refrain from taking payment of their remuneration, and they will continue to use their best efforts to bring the affairs of the company as soon as possible into a dividend-paying and satisfactory condition.

The CHAIRMAN said this meeting was of importance, for he might fairly describe their present position as a crisis in the affairs of the company. The main question to-day was whether they would continue their confidence in the management in Australia, and whether by their vote they would express that confidence, and continue Mr. Morehead in his position, for in a letter to himself Mr. Morehead had notified his intention to resign if he did not possess the confidence of the shareholders in his management. Their colliery was second to none in its capacity for production and the quality of its coal. They were aware that an attempt was made to carry on the coal trade under what was known as "the 10*s.* agreement;" but their manager, after a very fair trial, seceded from that agreement, finding that others did not conform to its conditions. Mr. Morehead did not withdraw until he found it absolutely necessary to do so. Since then there had been great competition, and the position of affairs was now that they had to work with very little profit, with the view of getting back their trade. The capacity of producing coal was far in excess of the demand. He believed, however, that would not long continue to be the case, and in that fact would be found the complete solution of the difficulty—a larger demand would spring up. That seemed almost inevitable from the great advance which had taken place in the price of English coal and the bare condition of the Eastern markets; and, when they considered that the hours of labour had been lessened, while wages had been increased, which must bring about a diminution of produce at an enhanced cost, they could judge whether the present state of things was likely to continue. His own feeling was that, at least, existing prices would be maintained, in which case they would be in a position to supply many of the Eastern markets, the Lambton coal being equal to the best Newcastle (English)—that, as he had already said, would be the peaceable solution of the contest at present going on in Australia. Mr. Morehead believed that also, and thought there would probably be some collieries out of the field shortly. Mr. Morehead's action was to prevent other collieries coming forward as competitors. He (the Chairman) attached great importance to the remarks made by Mr. Holden, who was a man in whom he (the Chairman) had great confidence. He thought it would be satisfactory to the shareholders to read the letter of Mr. Holden to the manager, which appears in the report of the directors. Mr. Holden was a large shareholder in the company, and a member of the Upper House at Sydney. The strong opinion expressed by Mr. Holden, who had long resided in the colony, carried great weight with the directors, and would, he hoped, do so with the shareholders. He then moved the reception and adoption of the report and balance-sheet.—Mr. Alderman WHETHAM seconded the proposition.

Mr. WRIGHT did not agree with the policy adopted by Mr. Morehead, and read an extract from an Australian paper in opposition to his action.

Mr. FREWER thought the attention of the directors should be directed to the point whether they as producers could not be brought more into communication with the consumers in distant ports, and thus lead to a change in the present condition of the trade. He believed the future success of the company much depended upon economy in working.

Mr. BOLTON said it was the duty of the shareholders to propose a want of confidence in the board and their manager. He had a letter from Hong Kong, in which it was stated that the company's Lambton coal was taken by engineers from choice. He moved, as an amendment, that the directors were not worthy the continued confidence of the shareholders.—Mr. PENDERED seconded it.

Mr. ANDERSON said Mr. Wright was continually bringing before this company the interests of the Australian Agricultural Company. The article read by Mr. Wright from an Australian paper simply amounted to nothing.

Mr. OTLEY said, from a long residence in the colony, whence he obtained information by every mail, he attached no importance whatever to the article read. The *animus* was so transparent that it would not have any effect upon the minds of those who knew anything about the colony.

The CHAIRMAN, in answer to some remarks upon the expenses of management, said the directors had agreed not to accept any remuneration for their services until the company was in a dividend-paying condition, which showed their confidence in the "good time coming." (Hear, hear.) They had the services of one of the best men in the colony—a man of considerable business ability and reasoning powers, and most highly honourable, at a very moderate salary. Did any shareholder think that the directors, who held a considerable interest in the company, would not realise dividends if it were possible? The directors liked dividends as much as anybody; but the permanent interests of the company were of more importance than straining after immediate profits.

After some further discussion, the amendment was withdrawn, and the report and balance-sheet was received and adopted unanimously.

Mr. Alderman Whetham was re-elected director, and Mr. Jas. Roberts auditor.

It was agreed to defer the consideration of the question of expending 500*l.* to test the Cadia property for copper and gold.

The CHAIRMAN stated that at the last half-yearly meeting a resolution without notice was carried by a small majority in the following terms:—"That no landed property belonging to the company shall for the future be sold without the previous approval of the shareholders." This resolution was very hastily proposed and carried, but being found to be directly contrary to Clause 18 of the Articles of Association, besides being inconvenient and disadvantages to the interests of the company, it was felt by the board to have no legal effect. The directors desired to mention this to the shareholders, and he suggested it would be desirable that the resolution should now be rescinded, and he proposed "That the same be rescinded accordingly," which was seconded and carried.

It was moved by Mr. OTTLEY, seconded, and carried, "That a vote of thanks and confidence be given to the directors and manager."

The meeting then separated.

EAST LLANGYNOG LEAD MINING COMPANY.

The ordinary general meeting of shareholders was held at the Clarence Hotel, Spring-gardens, Manchester, on April 25. There was a large attendance. The chair was taken by Mr. JOSHUA MOSS.

Mr. J. B. CLARKE (the secretary) read the notice convening the meeting, and also the directors' and agent's reports:—

"*Directors' Report.*—In presenting their first annual report the directors are gratified to be able to state that the success attending the operations at the mine had exceeded their anticipations. Although many thousands of pounds had been expended on this property, in driving levels, &c., previous to its coming into the hands of the present company, yet the mine had not been properly opened out. The directors have, therefore, concentrated their efforts in developing the property, and connecting one level with the other. These operations necessarily occupied much time, and involved a heavy expenditure, but have resulted in the discovery of some splendid courses of ore, and the lessening of the future working expenses of the mine. A winze has been sunk connecting No. 1 with No. 4 levels; this has ventilated the mine for about 40 fms. To accomplish this has been very costly, inasmuch as the water had to be pumped by hand, and the debris and ore had to be wound up by hand to No. 1 level, then to be trammed out and the ore taken down the side of the mountain. Now, however, that this is completed the water is let down to No. 4 level, and the winze has been cased, so that the ore can be sent down to No. 4. This will be a lasting benefit in the future working of this part of the mine, as it will save quite half the cost. Since this was finished regular monthly sales have been made. Already 1960*l.* worth of ore has been sold, which, taking into consideration the difficulties which have to be surmounted in order to bring the mine into this position in so short a time, is of rare occurrence. An agent's house, timekeeper's house, barracks for the men, offices, smiths' shop, stable, &c., have been erected. A new crushing-mill and jiggers have also been put up, and your directors are glad to have to report that more ore is now being turned out from the various levels (some of which are worth for ore from 50*l.* to 90*l.* per fathom) than can be dressed and prepared for market with our present machinery, thus necessitating further expenditure in that direction, and the purchase of additional horses. Had it been the object of the directors to dress up all the ore they could, and put it on the market, so as to pay a small dividend, this could have been accomplished, but, believing as they do, that if properly opened out it would become a lasting dividend mine, they decided to develope it in a miner-like manner, being fully convinced that the result of this policy would amply compensate them and their fellow-shareholders. The mine is now more than paying working expenses, and, judging from present appearances, the directors believe that at no very distant date dividends will be regularly paid. The directors, who have the largest interest in the mine, congratulate themselves and their fellow-shareholders on having secured such a valuable property."

Agent's Report, April 18.—In presenting this my first annual report it may be necessary for me to enter into some details as to the operations carried on at the mine since my appointment as agent. The chief operations have been confined to developing the mine, in the accomplishment of which several valuable lodes have been cut, a good deal of ground has been taken away, and several good stopes opened out. A great amount of difficulty was experienced in sinking the winze, in consequence of the water; and also in putting up the rise from the No. 4 level, owing to impure air. This, however, has been overcome, and a very splendid lode laid open: 17 fms. have been driven east of the winze, through a course of ore averaging 18 in. wide solid lead, with backs to work upon at least 20 fms. This lode has been driven 15 fms. west of winze. There are here 12 fms. of backs untouched. The No. 2 has been driven about 20 fms., on a course of lead ore from 12 to 20 in. wide. The lode in the No. 4 has been cut; this lode gives 31 fms. of backs. From No. 4 to the top of the mountain is over 50 fms. We are now producing more than our present machinery can dress, with every prospect of a large increase. Altogether, I can with confidence say that I have never seen a mine with more points of interest, or which offers greater facilities for economical working, or one which is more likely to prove of lasting advantage to the shareholders, than this one; and should the deep adit prove rich in ore, of which there is every probability, I have no hesitation in saying it will prove one of the finest properties in Wales.—E. PASCOE.

The CHAIRMAN said he thought all shareholders, after reading the report of the directors, would give them credit for having stated the condition and prospects of the mine in moderate language, and he did not know that many remarks were called for from him in addition to that report. He remarked, however, that every day only confirmed his convictions that in East Llangynog Mine they had a very valuable property, the value of which can only be ascertained after some lapse of time, but that all the indications went to show, almost conclusively, that there was an immense body of mineral there, which only needed the necessary appliances to bring to surface, and ultimately to market. The directors would have had very great pleasure if they could have seen it in their way to have spoken more definitely on the subject of declaring a dividend, but they must bear in mind (as all who have had much experience will have learnt already) that mining operations are necessarily slow, or more or less uncertain. They might form their own conclusions from the indications which are apparent, but it is found as they go on that obstructions are met with which could not have been foreseen. He assured the shareholders that the one great object of the directors was to develope the mine in the most economic manner, but not with that false economy which is not saving in the end. He thought they were fortunate not only in having a good mine, but also in having as directing manager the gentleman who fills that post, a gentleman of considerable mining experience, one who possesses a great amount of knowledge of mining, who has studied the science of metallurgy and mineralogy, and who has devoted much personal attention to mining generally. He (the Chairman) knew that he had devoted, at very great personal inconvenience, a large amount of attention to this mine. He went down frequently, and did not content himself with the agent's report, but examined everything for himself; measured off the work, and in every way watched over the interest of the mine, its working, and expenditure. They were fortunate, too, in having Mr. Pascoe for agent, a shrewd, careful, experienced miner, and who had the talent of laying out work well, and of carrying into effect his own designs. They were indebted to Mr. Pascoe for the manner in which he had attended to the opening out of the mine, the erection of patent jiggers designed by him, without the aid of an engineer, also in the placing of the incline, together with the winding cage at the top, which had saved the company many thousands of pounds outlay. He had also brought the water from the Pistill Rhaiadr waterfall, a matter of great importance and great value to the mine. After having watched carefully the proceedings both of the agent and managing director, having also looked at the evidences they had altogether of the value of the mine, he had great pleasure in moving the adoption of the report which had been read.

Mr. W. H. MORRIS said that before he became a shareholder in the mine he went to look at it, not because he expected to find any faults, but just to see for himself, and he was certainly very much pleased with all he saw. He had every confidence in the mine, and he begged leave to second the adoption of the very brief but very comprehensive report they had just heard read.

Mr. S. COUPE said he could endorse Mr. Morris's opinion, although he did not know him. He went down to the mine about six weeks ago, and was perfectly satisfied in every respect with what he saw below, and with what he saw above. He had not the least fault to find with the workings of the company, and would most willingly support the resolution before the meeting.

Mr. J. P. ENDEAN complained of the difficulty of getting information as to the working of the mine from the secretary or directors, and stated that he had applied several times for a list of shareholders without success, and that as a shareholder he was placed at a disadvantage with Mr. Taylor; and, not having had time to communicate with his clients and friends, he moved that this meeting be adjourned for 14 days.

The Rev. J. MARRINER seconded Mr. Endean's proposition, as he thought he had some ground of complaint.

Mr. W. H. MORRIS said he hoped the meeting would distinctly understand him. What he wished was that the report should be adopted, with any exceptions that Mr. Endean liked to propose. The question was whether the report was to be passed or not, and he recommended Mr. Endean to propose an amendment.—Mr. ENDEAN said he had moved an amendment, that this meeting be adjourned 14 days.

Mr. J. TAYLOR (the managing director) said that prior to either the amendment or the original resolution being put he should like to make a few remarks. He said Mr. Endean had put forth reports in his Circular which had led the public to believe that they had emanated from the agent,—and that the Chairman would tell them that that was the reason why the reports had been kept out of the *Mining Journal*. He (Mr. Endean) had given the agent's reports in his Circular, and had made the agent appear to say that "this mine will undoubtedly be the richest mine in Wales;" and had further stated in his Circular that he "was confidently informed that the mine would immediately pay a dividend," and that "if one were not declared in January, 1872, he would undertake to refund 5*s.* per share of the purchase-money to all his clients who purchased after that date," whereas he had no authority from the company for making such misleading statements. He (Mr. Taylor) said further, that Mr. Endean's charge about getting lists of shareholders was quite untrue; he had already had two lists, and it was no little matter to make a copy of the register, as there are more than 700 shareholders. He said he had told Mr. Endean that it was quite possible, from the manner in which the mine was then opening out, that a small dividend might be paid at this meeting; this could have been done but inasmuch as a larger quantity of machinery would be required for dressing operations it was thought advisable not to declare a dividend now, and then to make a call immediately afterwards. There was ore now that would enable them to put double the quantity on the market had they machinery, but they would require double the number of horses they now had to convey the ore to the station.

The Rev. J. MARRINER said that, Mr. Taylor's reply being so satisfactory, he withdrew his seconding of Mr. Endean's motion.

The motion that the report be received and adopted was then put to the meeting, and carried unanimously.

The CHAIRMAN then moved that the financial statement read by Mr. Baxter, the company's auditor, be adopted.

A SHAREHOLDER remarked that the balance-sheet ought to have been sent to the shareholders a week before the meeting.

Mr. J. TAYLOR said that the matter had been discussed by the board, and it was thought that as many of the shareholders might not be able to attend the meeting they would be only conferring a favour upon them by sending it after the meeting, with a statement of the proceedings of the meeting. It would be for the extraordinary meeting, to be held after this meeting was concluded, to decide whether the balance-sheet should be sent out seven days before or seven days after the meeting.

Mr. MEGRIM rose to second the proposition moved by the CHAIRMAN, that the balance-sheet be received and adopted. He said that he knew much about the expenditure, and something about the income. He had himself gone carefully over all the items, and could vouch for their accuracy. It would be seen that there was a balance of assets over liabilities of more than 1800*l.* Had it not been for the energy and determination of Mr. Taylor that balance would have been at least 1000*l.* less than it was. He had, for instance, bought large quantities of timber on the company's account, which could now be sold at a profit of from 25 to 30 per cent. Once or twice each month he went into every part of the mine, and measure up the work, so as to keep down expenses. Of course, having so large an interest in the property he had been serving himself while he was serving the shareholders; if he had not so large an interest they could not have expected him to have worked with such perseverance as he had done.—The resolution was put to the meeting and carried unanimously.

It was decided that the next ordinary meeting should be held about Feb. 24, 1873, instead of April 24, and that the accounts should be made up to the end of December, 1872, so as to give the auditor sufficient time to make out the balance-sheet, so that a printed copy could be sent to each shareholder seven days before the meeting.

Mr. David Baxter was appointed auditor for the ensuing year, at a salary of 21*l.* per annum.

Mr. THOMAS WHITEHEAD said he should like to ask whether there had been any other complaints of impediments having been thrown in the way of any shareholder inspecting the books? What he wished was that they should have the confidence of each other, and that every facility should be afforded to the shareholders. He simply wished to know whether the complaint of Mr. Endean was confirmed by other shareholders.

Mr. TAYLOR said that no complaints had been made on that head. Several shareholders said they had been afforded every facility for inspecting the register, and obtaining such information as they required.

The CHAIRMAN said that Capt. Pascoe, the agent of the mine, was present, and would be glad to answer any question asked with respect to the mine.

Capt. PASCOE, in reply to a shareholder, said he hoped to return somewhere about 50 tons per month, and if the machinery were increased he should think they would be able to return over 100 tons per month. If they put up new machinery they would have larger returns of ore. If they put up a screen, and parted their stuff, they would very soon double the quantity of ore they were dispatching now. They wanted a screen to size their stuff, and a new set of jiggers erected, with buddles for the sand and fine smalls, then, of course, their returns would increase. They had large quantities of ore, but had not as yet the necessary means of dressing it and taking it to market. He could only say that they had one of the best mines he had ever seen for the time this company has worked it. He would only be too proud to show any of the shareholders what they had in East Llangynog. For his own part, he was not a man that sent out glowing reports; he liked to send out the truth, and thought he could refer to gentlemen who had inspected the mine and seen his reports, and they had all come to the conclusion that they had been too low. He thought it foolish to issue glowing statements. He had given the mine his best attention since he had been there, and he felt grateful to the directors for the kind way in which they had spoken of his services. He had been there morning and night, and had never been off the mine a day since he was appointed until to-day. He was happy to say that they had a prosperous mine. They had driven 17 fms. through a course of ore, which they had discovered on communicating No. 4 to No. 1, 18 in. wide on the footwall; on the hanging side they had a rib of ore 8 in. wide that had never been touched. They had also cut the lode in No. 4 Mine, or 10 fms. below the course of ore that they had cast of the winze; from that course to No. 1 they had 21 fms. Above that level they had two stopes, yielding from 3 to 4 tons per fm. On the whole, the mine was looking first-rate.

Mr. TAYLOR said that since the dead work was completed they had made regular returns; they had made a previous return of ore, broken prior to taking possession, of 40 tons the early part of last year, but he was now speaking of what had been done since the mine had been opened out. They sold 34 tons in February at over 12*l.* per ton, in March the returns were increased to 40 tons, at 12*l.* 15*s.* per ton, and last week but one they sold 50 tons at 13*l.* per ton, and he believed if the No. 4 and deep adit cut rich they would be able to return over 200 tons per month.—A SHAREHOLDER said he should like to have some idea when it was likely the machinery would be erected for returning 100 tons per month?

The CHAIRMAN explained that they found they could not depend upon any erectors of machinery in that district.

Mr. TAYLOR said he should think they might have the jiggers ready in about three months, but that they would require another crusher. Orders were already given for castings and buddles.—Mr. NASMITH said they were all satisfied that there was an abundance of ore in the mine, which only wanted getting out. He had been listening to Capt. Pascoe, and he thought the true policy would be to order the machinery in anticipation, and not to wait until the ore was lying about in heaps.

Capt. PASCOE said it had been a mistake generally that great preparations had been made for machinery before they had any ore to dress.—Mr. NASMITH said that since they believed the lead to be there they should not have the machinery behind.—Capt. PASCOE explained that a great deal depended on the quality of the stuff. If the ore came out solid they could return 100 tons with their present machinery.—Mr. C. J. GALLOWAY enquired whether that meeting had not to elect new directors?—Mr. C. KEARSLEY (the company's solicitor) explained that two directors had become disqualified, and as no other shareholder had expressed a wish to be elected, in conformity with the Articles of Association, this meeting could not elect any others.

In reply to Mr. Galloway, Mr. MEGRIM said that there were four directors. The Articles required that there should not be less than four, nor more than seven.—Mr. TAYLOR said that Mr. John Denton, of Leeds, had expressed his willingness, but not in the manner prescribed by the Articles.

Mr. GALLOWAY said he thought four directors were quite sufficient.

The CHAIRMAN said that as the ordinary business was over they would at once proceed to the business of the extraordinary meeting.

EXTRAORDINARY MEETING.

Mr. KEARSLEY proposed, and Mr. MEGRIM seconded, that inasmuch as the Articles of Association did not give the directors power to forfeit shares for non-payment of calls, that the whole of the provisions under the head of forfeiture be withdrawn, and others inserted in lieu thereof, similar to Clauses 17 to 22, Table A, Companies Act, 1862.—Carried unanimously.

Mr. KEARSLEY proposed, and Mr. MEGRIM seconded, that Section XII. of the Articles be rescinded altogether, and provisions similar to those numbered 44 to 50, Table A, Companies Act, substituted.—Carried unanimously.

It was resolved, on the motion of Mr. KEARSLEY, seconded by Mr. MEGRIM, that Clause 56 of the Articles should be removed from under the head of ordinary meetings to that of votes of members.

Mr. BAXTER proposed that the best thanks of this meeting be presented to Capt. Pascoe. He thought it was well that they could have a captain whose opinion could always be considered to be under the mark.—Mr. NASMITH said he had great pleasure in seconding the resolution, for he believed the captain to be an honest man.—The proposition was then put to the meeting, and carried unanimously.

It was unanimously resolved, on the motion of Mr. GALLOWAY, seconded by Mr. COUPE, that the best thanks of the meeting be given to the directors, for the way in which they had conducted the business of the company during the past period.

The CHAIRMAN, on behalf of the directors, said he was sure he spoke the sentiments of his fellow-directors when he stated that this resolution was very satisfactory to them. Their object had been in all their statements to be moderate, and to feel that they were saying no more than they were fully warranted; and he felt sure they would work together more cheerfully after having this resolution so unanimously passed.

The proceedings terminated with the usual complimentary vote to the Chairman. [For remainder of Meetings see this day's Journal.]

FOREIGN MINING AND METALLURGY.

There is little news to note in connection with the Belgian coal trade. Prices are maintained with extreme firmness, but they are not advancing at the same headlong rate as those of iron. Coke is more urgently sought after than coal, and some sacrifices are made in order to obtain it. Unwashed coke has realised 1*l.* 0s. 10d. per ton in the Mons basin; washed has brought 1*l.* 4s. per ton, and even higher prices have been obtained for small quantities. All the working staffs are employed in the extraction; stocks are small, and deliveries do not diminish, although at this period of the year the demand is usually less active. It should be added, however, that if stocks are formed with difficulty, and if the extraction scarcely meets the demand, this arises from the tendency of many workmen to desert mining pursuits at this period of the year for field work, brick-making, &c. In former years this habit was not a matter of much moment, but this year, in consequence of the activity in affairs, it is much regretted by the coalowners, as no reserves will be accumulated to meet the inevitable increase in the demand as the year advances, and profits will be diminished in consequence. Coalowners also complain of the advance in wages. From Austria a slight fall is announced in the price of Silesian coal; at the same time, the consumption continues very heavy. The Sacré Madame Colliery Company commenced the payment, on Wednesday, of a dividend of 6*l.* per share for 1871.

The activity which has been noted for some time past in the French coal trade appears to be increasing. Industrials show a disposition to lay in supplies during the present comparatively quiet period of the year, so that they may not suffer from a scarcity of combustible later in the season. They are the more inclined to do this as coal traffic is now conducted with a fair amount of regularity. A good deal of attention is being directed just now in France to canals; some of the plans proposed are of a comparatively chimerical character, but steps are being seriously taken to improve the navigation of the Burgundy Canal. M. Larmangeat, inventor of a road locomotive system, has applied for a concession in connection with haulage on the canal. The present French Government has also shown a disposition to continue the canalisation of the Moselle, commenced under the Empire. It is proposed to carry out as between Ars and Thionville plans approved long since. Further, if we can believe certain journals, the German Government proposes to add a port to Metz; this port would be united by a branch to the canal from the Marne to the Rhine. The French Minister of Public Works has charged M. Dureteste, a navigation engineer at Chalons-sur-Marne, with some supplementary surveys in connection with the canal from the Marne to the Saône, more especially with reference to the portion between Donjeux and Gray. The St. Chamond Colliery Company is issuing 1725 obligations, in order to raise capital for the execution of sundry exploratory works; the company possesses one of the most extensive concessions in the basin of the Loire (7044 acres). The Bességes Colliery Company has been paying since Tuesday the balance of the dividend for 1871, or 18s. 4d. per share.

Copper has experienced scarcely any change at Paris. At Marseilles there has been a fall, amounting in some instances to 2*l.* per ton. The German copper markets continue to present a favourable tone; prices are firm, and transactions have been even animated. There has been no change worth noticing in tin at Paris; at Marseilles, on the contrary, a rather important change has occurred, Banca having been carried to 168*l.*, Straits to 172*l.*, and English to 174*l.* per ton. There has been no material change in tin upon the German markets. As regards lead, it may be observed that French delivered at Paris has made 20*l.* per ton, and Spanish delivered at Havre 19*l.* 12s. per ton. At Marseilles lead in saumons, first fusion, has realised 19*l.* 4s. per ton. In Germany lead has been in rather better demand. At Rotterdam, Spanish is quoted at 11⅞ fls., Stolberg and Eschweiler at 12⅜ fls., and German lead of various marks at 12 fls. to 12⅛ fls. At Paris, Silesian zinc delivered at Havre has realised 23*l.* 16s., other good marks delivered at Havre 23*l.* 12s., and ditto delivered at Paris 23*l.* 12s. per ton. At Marseilles, Vieille-Montagne in sheets has brought 32*l.* per ton, and other marks 30*l.* per ton. At Hamburg zinc has shown rather more activity.

The prices which were attempted a few days since in Belgium have now become confirmed. Quotations, which were firm, display a tendency to go higher; in fact, there is a continuous advance, and as English pig is rising it is, perhaps, not unnatural that Belgian should rise also. The works are active, and the demand is strong, so that some persons may be inclined to ask what there is to be feared; nevertheless, it cannot be denied that there is something unnatural, and even dangerous, about the situation. The present advance does not proceed from a new and stable equilibrum between the supply and the demand, but it arises from accidental circumstances, the effect of which might be dissipated on the advent of any disaster or political difficulty; and, however much Belgian industrials may be elated for the moment, it cannot be said that their future is well assured. Belgium is essentially an exporting country as regards iron, but she now sees Germany and Austria improving their processes and increasing their production, while France is obtaining a footing upon markets in which Belgium formerly reigned supreme. To return to the present, we may note that refining-pig has just been carried to 4*l.* 12s. per ton, while casting-pig brings 5*l.* 16s. and 6*l.* per ton. Châtelet quotes No. 2 iron at 10*l.*, and sheets at 12*l.* per ton, according to tariff. No. 1 iron has just been carried by some companies to 9*l.* 12s. per ton. A new tariff for plates which has just been issued carries No. 2 to 12*l.*, and No. 3 to 12*l.* 16s. per ton. The production under these influences displays every day a tendency to increase. MM. Piérard Frères are adding to their Montigny-sur-Sambre foundry a rolling-mill for merchants' iron and plates, and are transforming their firm into a company, to be known under the style and title of Messrs. J. and S. Piérard Brothers and Co. The capital of the company has been fixed at 20,000*l.* The rolling-mill is expected to come into operation Sept. 1. The market for rails has been revived and strengthened this week by the conclusion of a contract for 2000 tons by the Couillet Company, at 10*l.* 8s. per ton, delivered at Antwerp. Other affairs are in course of negociation for Austria and Turkey, and have a chance of coming to something if the guarantee clause is suppressed in contracts. Purchases of old rails for America are being made upon the Belgian markets at 7*l.* to 7*l.* 4s. per ton. The Couillet Company have recently re-lighted a blast-furnace, and the same may be said of Messrs. Gillain and Co., of Chatelet.

There is still a continuous advance to note in prices in the French iron trade. The advance remains somewhat behind that which has been established in neighbouring countries, and this circumstance inspires confidence. The French can, in fact, now only obtain iron among themselves, the excessively high prices prevailing in England and Belgium, and the very great difficulty of securing deliveries, closing those two nations to the French market. The state of affairs is, then, exceptionally good, and the advance is expected to be carried to a still higher point, and would no doubt rapidly attain it if business had not to contend with the general want of confidence which for more than a year has weighed upon all transactions. Charcoal-made pig is dealt in at St. Dizier at 5*l.* 16s. to 6*l.* per ton. Grey pig, second fusion, has risen to 6*l.* 4s. per ton. As regards iron, every one regulates its prices by his greater or less confidence in the upward movement, and there is very little uniformity. Thus rolled coke-made iron ranges in price from 9*l.* 12s. to 10*l.* 16s. per ton; and charcoal-made from 11*l.* to 12*l.* per ton. A new general advance of 16s. per ton is anticipated. An active demand prevails for old rails, which are purchased for the American market at about the price at which new rails were sold last year—7*l.* 4s. per ton. It is expected that more pig-iron will be in future imported into France in consequence of the annexation to Germany of an important centre of production. French industrials are now executing orders for Turkey, Russia, and Hungary; profiting from the excessive elevation of prices they have gained a footing in those countries.

PYROLITHE.—This name has been given to a series of improved explosive compounds invented by Messrs. TERRE and MERCADER, of Liége, Belgium; they are composed of sawdust or other granular or pulverous carbonaceous substance, nitrate of potash, nitrate of soda, sublimed or powdered sulphur, coal powder, and lignite powder, in the following proportions:—For blasting marble or granite quarries, and other hard substances, they mix together 12·5 parts by weight of sawdust, 67·5 parts by weight of nitrate of potash, and 20 parts by weight of powdered sulphur. For blasting limestone and chalk quarries, and coal or other substances of a comparatively soft nature, they mix together 11 parts by weight of sawdust, 51·50 parts of nitrate of potash, 16 parts of nitrate of soda, 1·5 parts of coal or lignite powder, and 20 parts of sublimed sulphur.

MALAGA LEAD COMPANY (LIMITED).

Although there is nothing especially new from Malaga this month, the reports we have in due course received from Captain Cocks give evidence of continued improvement as the mine becomes more opened out. The shareholders will have understood that the first adit level driven by this company has been holed to the lode, which has been proved to be very rich; and a second has been commenced, which Captain Cocks reports is progressing in the most favourable manner. When this has been accomplished, and the levels have been communicated by winzes, two new levels will be at work in whole ground, which will rapidly open out reserves of lead, which can be speedily returned at a very small cost, and consequently at a very large profit. All this is, of course, irrespective of the old workings, which are being gradually cleared up, so that the gangue ores may be laid open so as to be economically taken away. This is already effected to some extent, but no men have yet been put to treat ore of this low class, inasmuch as the machinery for its treatment has not been yet erected. As stated in our last, Mr. Talt Brindley, has been in England, making a complete and minute survey of the dressing apparatus and appliances in use at our great English and Welsh lead mines, in order that the machinery to be erected at the Malaga Lead Mines may be of the most recent and appropriate construction. He has now returned to Spain to confer with Captain Cocks, and his final report, with the drawings and specifications of the machinery and appliances, is anticipated by an early mail. When received and comfirmed by the directors, orders will be at once given so that the machinery may be got on the mines with as little delay as possible.

The following reports have been received from Captain Cocks during the past month, and, at the risk of repetition in some respects, we give them in full, feeling sure that nothing can be so satisfactory to the shareholders as knowing exactly what their agent has written with respect to the condition and progress of the mines.

Under date April 13, he writes:—In the shallow adit level, on the old part of the mine, I have proved the slide of clay that came in, and discovered the lode to be 8 yards thick, and it appears to have cut out all the ore going above the clay or slide, but the lode is going down carrying its regular course and maintaining its size, and producing rich silver-lead ore in good quantities. In No. 1 cross-cut the No. 1 end, driving south on the course of the lode, is producing saving work, with a strong lode, and every appearance of increasing in value in a short drivage, as the ground appears to be easier for driving. This end is driving at $7 per vara, or about 3*l.* per English fathom. In No. 1 stope, in the back of the above, we have a decided improvement. The men stoping struck into a leader of rich silver-lead ore, 6 in. wide, solid lead, just in the centre of the stope, and this leader appears to be going north and south, and going up as well. There is no doubt but that it will continue up to the west level, and the lode going down was very good indeed. This is a highly promising part of the mine indeed. I have four men working in these stopes, and shall commence the second stope in this level this coming week. The ground is easy for exploring, and very congenial for mineral in this part of the mine. No. 2 lode we are also driving south on the course of, and which is producing a good quantity and quality of lead ore. The lode is 2 ft. wide, with a leader of lead ore 3 inches wide, and all the lode produces good dredge work. This end is being driven by six men, and as this part of the mine is now well ventilated, the men are making good progress, and the ground is easy for driving, with every indication of the lode improving in quality. On No. 2 lode I have also four men stopping in the back of this level, and the stopes are yielding an average quantity of rich ore. In these stopes there is a solid leader, 3 in thick; indeed the ore is good enough to be sent to market without dressing, but we do take it to the floors and put it through one process. We are driving the deep adit cross-cut level by six men, and the ground is much improved for driving. This cross-cut will intersect the lodes 20 fathoms deeper than where they have been seen; this end is being driven at $10 per vara, the men to provide all materials to work with. I calculate it will take us three months to intersect No. 1 lode in this cross-cut. I look forth to the cutting of the lodes in this cross-cut to be a very important point indeed, as it will entirely open out the mine 20 fathoms deeper, and I am sanguine we shall be well rewarded for the outlay, for the lodes are gone down very strong and rich for silver-lead ore. I shall push on this cross-cut with all possible dispatch I can. At the dressing-floors we have large piles of work in the way of dressing and dressed, and the dresser is now engaged in erecting some more dressing appliances, so as to dress with greater facility and dispatch, as there appears to be some weed in some of the lodes that has to be taken out; indeed, the mine and the works at surface are all progressing favourably, and ere long you will have constant sales and good dividends. The Englishmen are all enjoying good health, and attend to their several duties in a proper manner.

Under date April 20, Captain Cocks writes:—I beg to send you the following as my report of the above mine. At No. 1 adit level the No. 1 end going south has improved this week; the ground is easier for driving, and the lode is improved in value, producing good work for lead ore. Nos. 1 and 2 stopes in back of the above level are much the same as last week, yielding good quantities of lead ore; the lode is about 18 in. wide, producing saving work all through the lode; and the leader in the lode is 4 in. wide, solid lead ore, of the best quality of steel-lead, and has every appearance of continuing to the upper level, which is 12 fathoms; this discovery of ore is lengthening north and south, so it is opening up good ground to stope away as soon as we get room to do so. No. 2 end going south of cross-cut lode, 2 feet wide, producing saving work for lead. Stopes in back of this level yielding saving work, although not rich at present, the further we go south on this lode the more it improves in value. Stopes in No. 2 cross-cut, or shallow level, are much the same as last week, producing saving work for lead ore, but not rich, but will well pay to stope away. In the present deep adit cross-cut we are making better progress this week; the ground is easier for driving; this cross-cut is a very important point, as it will cross-cut all the lodes 20 fathoms deeper than the lodes have been seen in the upper level. As we have left the lodes going down rich there is not the slightest doubt of cutting the lodes rich at this point, and if so you will then have a rich mine indeed. I am very sanguine of opening up the mine rich at this point, which will be completed within the time named—that is, to cut No. 1 lode in three months, when we shall have good backs, 20 fathoms stope, under the slide of clay that cut up the lode in the shallow level. The mine is looking very well indeed, yielding good quantities and quality of ore, the same being taken to the floors in readiness for dressing. All the new dressing machinery is nearly complete, and will be, most of it, fixed in the coming week, when the dresser will be able to dress the ore in a proper manner. It is necessary to have these machines to separate the blende and iron that are in some of the lodes, so as to send the pure article to market, not to pay freight for rubbish. All is going on satisfactorily at the floors, and all the surface works—indeed the mine, on the whole, is in a cheerful state. All the Englishmen are enjoying good health, and attend to their several occupations in a regular and proper manner.

P.S.—Since the above was in print we have received the following report from Capt. Cocks, under date April 25:—"I am pleased to inform you that our stopes and ends are looking quite as well, if not better, than reported on last week. The more we open the mine in new ground the more favourable appearances become. It is just now four months and one week since we commenced operations in the above mine, and we have succeeded in clearing it and driven one new cross-cut, sunk a new winze, and opened on three different lodes; and I am now driving two ends on the course of the lode, and also driving a new adit cross-cut. We have erected dressing-floors, built necessary dwelling-houses for the Englishmen, with carpenters' and smiths' shops, and office and store-houses, also a good yard. We have also some parcels of lead ore already dressed and large piles on the floors in way of dressing. I assure you we have exerted ourselves to the utmost to get the mine into a regular way of working, so now you can now see our position. The mine is now being got into a mining-like manner. I am sorry to inform you that we have been hindered in getting many orders executed according to order, and have been kept a considerable time without them. The Spaniards say—'Yes, to-morrow—to-morrow—to-morrow,' and so they go on; but at last the things are forthcoming. And we have also had heavy falls of rain for some days past, so that no one could work on the floors, which has been a temporary delay in our getting ore ready for shipment. As the foregoing is now being got over, I hope to report to you in my next of ore being taken to the shipping port for shipment. I will advise you of the same, which can now be relied on being carried out forthwith.

The No. 1 cross-cut adit, or No. 1 lode: The end going south is much the same as last week, maintaining its size and producing lead ore, and improving as we go south.

No. 1 and No. 2 stopes, in the back of this level: The lode and leader in the lode are maintaining their sizes, producing splendid silver lead ore, and yielding good quantities, with every appearance of continuing to do so. The ground is easy for exploring and congenial for mineral, and the lode is of the same character as where we left it going down in the shallow level. I see no reason why this lode may not continue up to the shallow level.

No. 2 end going south, on course of lode: The lode is leady throughout, not rich, although it is producing saving work, and the ground appears to be changing; as the ground gets softer the more productive is the lode. The stopes in the back of this level still produce lead ore, which well pays for stoping away. The men are now engaged in taking down a piece of ground by the side of the lode, and when taken down we shall be in a position to speak more particularly as to the character and quality of the lode, where I am expecting an improvement.

No. 1, or shallow adit level: The stopes in the back of this level, under the slide of clay, have very much improved; indeed, we have a splendid piece of ground opened on here at this point, which we are stoping on, and I find the ore to be going down, a good lode indeed. So our bottom cross-cut will come in under this ore that is gone down. We have forty men, boys, and girls employed on these mines.

The bottom cross-cut: I am pushing this with all possible dispatch I can with six men, working it day and night. We have already driven 12 yards, and the ground is still favourable for driving; and I fully believe the first lode will be cut by the time specified. I cannot pass over this portion of the property without commenting on the desirability of working these lodes at greater depths, as from the evidence afforded by our actual workings on the shallow portions of them lead ore in immense quantities will still be found as depth is attained. The lodes will also become better defined, and the mineral concentrated and less ganguey. SAMUEL R. COCKS."

—*Liverpool Mining Circular:* Liscombe and Co.

TIN IN NEW SOUTH WALES.—In addition to the information published in the Supplement to last week's Journal, we have received the following extracts from recent Australian papers:—

On Monday Captain Holman informed us that to that date he had dispatched from Oban 14 tons of stream tin, and he had then about 20 tons additional ready; 4 tons were sent *via* Grafton, but the delay by that route will probably cause further consignments to be dispatched *via* Armidale, as the 10 tons were. The *Newcastle Chronicle* says:—On Monday a quantity of tin, 19 cwts. 1 qr. 17 lbs., smelted at the Burwood Works, from ore the produce of the Oban Mines, was shipped by the Morpeth to Sydney. There were in all six large blocks of, apparently, a most excellent metal.—*Armidale Telegraph.*

TIN FROM NEW ENGLAND.—We observe that among the cargo of the Australian Steam Navigation Company's steamer, Coonanbara, from Morpeth, on Tuesday, was a large quantity of tin ore, forwarded through Messrs. Jaques and Co.'s forwarding agency, from the now celebrated Oban Tin Mines, New England, worked by Messrs. Bagot and Clarke. The ore in question was packed in neat canvas packages, which, though of small dimensions, weighed about 1 cwt. each. The ore consisted of small granules, about the size of blasting powder, and it is said by those capable of judging to be equal in density and richness to the produce of the famous mines of Cornwall, in England. It will be exhibited at the rooms of Messrs. Mort and Co., Sydney, for some time previous to being shipped for England.—*Maitland Mercury.*

FOREIGN MINES.

ST. JOHN DEL REY.—The directors have received, per Gironde, the following report, dated Morro Velho, April 1: Morro Velho produce, second division of March, eleven days, 855 oits.; yield, 1·132 oits. per ton. This produce is from rock quarried at surface at very little expense, and the produce is accountable as contributing towards the general expenses of the establishment. Gain produce, second division of March, eleven days, 506 oits.; yield, 1·533 oits. per ton. The new shafts pump has been doing good and effective duty since the 16th ultimo. The East Quebra Panella pump was put to work on March 22, and is raising all the water from that section of the Bahu. By the combined action of these two pumps the water has been lowered in the new shafts 67 feet in 15 days, or at the rate of 4 feet 5½ in. per diem.

DON PEDRO.—March 28: Produce to date, 6660 oits.; estimate for month, 8660 oits. The attendance of force for the last two weeks has not been quite as good as formerly on account of the holidays, consequently less hands have been assigned to prospective work and explorations, but a regular force has been engaged raising gold. The general ores now being derived from the mine are of much the same quality as when last reported on. The lode in Cassa retains its value of fair strake work, but the line of gold still fluctuates; on extracting it yesterday the samples were of low value; to-day we are happy to state it has greatly improved, and the samples from same are of good quality. The lode in the southern stopes, descending on No. 8 shoot, is still fair in yield, and the line which was for some time embraced in general stoping has latterly improved, and has given a small quantity of fair box work for the wash-house. These stopes have been communicated by an incline from the tattoo driven from the 25 fm. level near Vivian's shaft, which will serve for an exit for water and transit of ores from the remainder of No. 8 shoot existing below the adit level. The line of gold in the northern part of No. 6 shoot, underneath the curve, being under water has remained untouched, consequently the quantity of box work obtained for the last fortnight has been limited. The new 8-in. pit work in Vivian's shaft was set in motion on the 18 instant, and has continued to work with good results. Sinking operations were commenced on the 25th. The repairs to Vivian's shaft have been continued; although this work is very precarious for the hands thereon engaged, it has been carried on satisfactorily. Nothing new has been met with in our explorations to notice.

GENERAL BRAZILIAN.—March 28: St. Anna: The shallow adit, No. 1, is not advancing so fast as we could wish, owing to ground being very soft.—Itabira: The shallow adit is progressing satisfactorily; the middle adit under suspension. Souzas vein producing stamps work, and cross-cut No. 3 advancing fairly. Produce since last advised 113 oits., and derived as follows.—Itabira Souzas Vein: Stamped at Dawson's and old mills, No. 1 and 2, 72 tons, which produced 113 oits.; yield, 1·569 per ton.

ROSSA GRANDE.—March 28: Bahu: Very satisfactory progress is being made in opening out on the lode in this mine. In the 10 west we have cleared the debris that was remaining a few feet below the level, and exposed the lode for a distance of 15 fathoms, which varies in size from 1 ft. 6 in. to 5 ft. wide, all of which is good stamping work; we are preparing to stope here with a small force at once, and after a communication is effected with Dinne's shaft I shall be able to put on a large force. The main lode in sump-shaft is still small, the footwall branch is producing good stamping work. Nothing calling for special remark has occurred in any other part of the mine.—Cachoeira: The lode in Richard's shaft is producing fair stamping work, and is about the same in size as when last reported on. The adit level I purpose extending until it intersects a shoot about 10 fathoms to the west of the present end; from the outcrop of this shoot I have taken some very encouraging samples.

ANGLO-BRAZILIAN.—March 30: Passagem: The greater part of the month has been devoted to the exploratory works at Barril and Gongo sections—the levelling of ground for the tramrails and the widening of the level for the discharge of the ores from the upper sections; the completion of this is looked forward to with great interest, as it will add very materially to our raisings.—Victoria Level: The three branches referred to in last report now form one solid body of ore 7 feet wide, and particularly widening towards Haymen's shaft. No great change to note in other parts of the mine. The surface works continue heavy, the alteration at Victoria stamps is complete. The force engaged in preparing timber for Barril team, and a new set for Foster's and Haymen's shafts. The produce even lower than last month, as the greater part of the mine force are still engaged on the required explorations.—Pitangui: Vertical Shaft, Franco Antonio Line: Progress rather slow, some hard bars of ground again appearing in the shaft. The news received from there to-day announces the cutting of water in small quantities, evidence of our near approach to the line.—Hosken's Level: We continue to experience great difficulties owing to the sudden changes of ground; the present end consists of heavy conga, or conglomerates of small stones and iron, a convincing proof that we are passing through made ground.—Value of Passagem Ores: There is not a doubt from the various trials made that the general body of the ores are worth from 5 oits. upwards per ton, some reaching from 25 to 62 oits. Bearing this in mind, while at Morro Velho I made arrangements to engage Mr. Wendeborn, the reduction officer, for two or three months, as may be required, so that he may make a thorough examination of the nature of the ores, and the best means of treating them. Of ultimately succeeding in effecting a much better produce I have not a doubt, and trust my procedure in this matter may meet with your sanction.

SAO VICENTE.—March 28: The works throughout the mine have progressed very well up to the present, but here for the first time I am suffering from want of hands to carry on the different works. This being the week before Easter the people appear to pay more attention to their Saint days and festivals than anything else.—Deep Adit: The men are making steady progress here, the back of the level is in disturbed ground, but from the bottom of the level to about 6 feet high the ground is unbroken and auriferous, and, as I stated in my last report, will all do to pass through a stamps. Viscount's shaft is without any material change since my last report.—Bernard's Adit: We are still making good progress in this place. During the past fortnight we discovered that a small air-shaft had been sunk by the former proprietor 36 feet, and filled to the surface; this we have cleared out and communicated with the level, so that we have now a fine current of fresh air. The level at present is quite crushed together, and filled with stuff and broken timber. There is also a large quantity of water issuing from same.—No. 1 Level: This level is being driven at the rate of about 50 feet per month. We are frequently crossing small lines of late which show a little gold in the bottom, but nothing to pay as yet. I am getting all the stuff sampled as broken, and using every precaution so as not to pass the minutest particle of gold unobserved. The most of those lines I intend working on as soon as I am able, as there is a possibility of their proving productive in other parts if further developed.—No. 2 Level: This level has passed through the course of flookan mentioned in my last, and is now in a course of very soft jacotinga, being very wet at present, it is also very troublesome.—No. 3 Level: This level is still very hard for driving, and slow progress is being made.—Watercourse: I am extending the rego around the hill towards No. 1 level, and also clearing out and repairing the old ones. I am getting on with the stamps as fast as possible. I have been obliged to erect two temporary rooms for the Englishmen.—Sao Vicente: I have visited this mine twice since the 16th inst., and I am glad to say got the second stamps to work the day before yesterday. I have also connected a line of pump-rods to the same wheel for the purpose of hauling the water out of an old working near Humphrey's. This has been accomplished, and some good specimens broken showing gold in the stone; I have put the men to break down a certain portion of the ground previous to my giving it a more careful examination.—Morro das Almas: At present the line is very small, but shows gold in the stone; I believe it will soon open out again, but as we are obliged to sink a few fathoms before we stope shall not be able to raise a great quantity of stone for some months. We have cleaned up a little over 100 oits. of gold, and are still engaged passing sand through the canoa. I find the wide line mentioned in my report of January 16 is dipping towards the shoots of gold in the old mine, and is opening out so large that at present we cannot define its width. I find the large rego is sadly out of repair; I am getting it cleaned and repaired as fast as possible; I am also getting the stamps houses built, and I hope in a few months to very materially reduce my expenditure here while I am proving the mine.

SANTA BARBARA (Gold).—March 26: We are now driving on the course of the lode and find the same easier to bore, but less favourable for quarrying. The level is now 9½ ft. wide, all lode; hanging-wall not yet seen. I would augment the working force to quarry lode where it commences to follow the contour of the hill, but I fear to do so, as the ventilation is far from good. If more force were employed there it would preclude all hope of holing to the old workings without recourse to artificial means for ventilation. I recommend, therefore, that no other operations be carried on than driving the deep adit to hole the old workings, which I am anxious to see, though equally anxious to open on the lode east.

TAQUARIL.—Capt. W. H. Martin, March 28: General Remarks: Operations at the various points are proceeding with regularity, but I regret very much that it is not in my power to report any improvement or new feature to call for special remark since my last advice. The work being derived from the stopes in the back of the 25 is very poor, consequently the yield at the stamps is looking small, and will scarcely pay the expenses of excavating and returning, although every economy and care possible are being exercised. The lode in the 25, west of Haymen's shaft, seems to be undergoing a change in its bearing and character, containing more iron and jacotinga, but the samples are poor. We have commenced to drive the 25 on No. 1 lode, east of Haymen's shaft, to make sure that the shoots are not divided below the 15, and a part gone in that direction. In the 18 west the lode has a more promising appearance, and must be getting very near the junction. The ground in the 15 fm. level cross-cut north is very hard, and progress slow. In the shallow adit, north from Haymen's shaft, we are clearing the deeris on the No. 2 lode to explore north a little in line of the shoots. There is a large auriferous lode in the shallow level, east of the stamping-mill, which we are in hopes will lead to something good. No change to comment on in any other part of the mine.

MALPASO GOLD WASHING COMPANY.—The general agent writes, under date Feb. 27—"Mr. Clarke has decided upon commencing operations at the eastern point of the mine, which made it necessary to bring the water on for a much greater distance than at first anticipated. All the launders and water-courses had been finished as far as the old frentes at Malpaso, but owing to the outlet selected being a long distance east of this point, about two miles of acequia would have still to be opened. Mr. Clarke has been looking at the work done, and estimated at the present rate that everything would be finished in three months' time. He had prospected proposed outlet, and got besides some very good prospects gold at every place tried." The superintendent, Mr. C. R. Clarke, writes under date March 18—"I am happy to inform you that I am recovering my health rapidly now, and am almost well again. To-day I made an examination of work done on the ditch, and the ground through which it is constructed. The ditch is about six miles long; although in a direct line the distance will not exceed 3½ miles from where the water is received to where it is discharged; the whole length, I think, is one immense mine, the deposit and formation being exactly the same clear through. It is very bad ground over which to build and maintain a ditch, but I think I can make it carry enough to thoroughly test the Malpaso, and if the test is satisfactory we can build a flume

ditch that will carry all the water that can be obtained, and start three or four more pipes at different points along the deposit. I have selected my outlet; Mr. Welton surveyed it, and I shall begin to put in sluice in a few days. Shall start with about 600 ft. Have prospected the dirt from the starting point up to the top of the bank, and am well pleased with the result. Have the side riveting of the pipe all done, and shall begin to rivet together to-morrow if my health continues good. I shall hurry the work all I can, and shall begin to wash with the least possible delay."

CAMP FLOYD (Silver).—E. B. Wilder, March 31: From the Sparrowhawk and Last Chance Mines we have extracted 279 280-2000ths tons of ore, averaging $78 per ton silver. From Sparrowhawk open cut I started a drift, nearly at right angles with the old drift, in the vein matter, and 28 ft. from surface. After drifting 10 ft. we struck a fine body of ore, whose extent at present is unknown; but from the fact that in a second drift, some 30 ft. north of drift No. 1, above-named, we have also met with a similar body. I have every reason to suppose that they are the same, and that we are getting into a very large body of ore. From three assays made the average yield of silver per ton is $129·86, and I would here remark that in obtaining these samples care was taken to avoid getting any of the ore on which the horn silver appeared. We are now in 7 ft. of ore, and with the exception of nearly two wheelbarrows of waste per ton, the whole mass will safely work at mill $160 per ton. From the fact that the ore has taken a downward pitch, the bottom of shaft No. 1 at present is still above the ore. The Last Chance cut has also exposed a body of antimonial silver, thus far 4 ft. wide by 6 ft. high, which will safely work at $120 per ton; and in a parallel cut westerly, Hughes's cut, another body of ore has been struck, bearing towards the Sparrowhawk drifts, above referred to, and which by assay the best yields $480·69 per ton silver. All these points above enumerated have been attained within the past few days. Shaft No. 1, owing to a very hard quartzite, has progressed very slow, an increase of 15 ft. only being made; present depth, 75 5-12ths feet. Shaft No. 2, on the Marion, has been sunk 13 ft., and a drift 16 ft. run in vein matter from the bottom, in which isolated pieces of antimony, partially decomposed, have been met with; entire depth, 55 ft. Shaft No. 3 has been sunk 33 ft. further; aggregating 61 ft. At 55 ft. down we struck a body of dark blue slate—killas, impregnated with sulphuret of iron or mundic, through which we are now passing. Shaft No. 4, by former report, was 19 7-12ths feet deep. Owing to favourable ground, requiring some timber, we have sunk 46 5-2ths feet, making present depth 64 ft. Had I, thus far, any base to work from, the required depth to strike the vein could readily be ascertained. One-half the building for the mill is up and enclosed, roof on, &c., and the remaining portion going up rapidly. I cannot, in conclusion, speak too highly of the bodies of ore alluded to thus far developed, but trust that in my future report, April 16, to be able in further prosecuting the works with vigour at these points to dispel any doubts that may have, or still, existed as the future success of the company, and all interested.

PINTO (Silver).—April 6: Mr. Powell, foreman of the Pinto Mining Company's mines, was in town yesterday. He reports the various mines of the company as looking splendidly. There are large quantities of ore on the several dumps, but owing to the impassable condition of the roads it has been next to impossible to transport it to the mill for the last few months. The mill will probably start up about May 1 for a steady run through the summer.——We had one day of fine weather, and last night a snowstorm. Wonder if our prediction that we shall have fine weather in June will be realised.—*Eureka Daily Sentinel*, April 19.

FLAGSTAFF—Telegram received on Saturday.—"Start furnaces steadily to-morrow. Patent issued. Lode were intersected by tunnel has increased in width to 5 feet. All good ore."

KANSAS.—Capt. James Williams, April 3: Gold sold during the month of March, $7721·46; smelting ore sold, ditto, $147·44; total, $7868·90; working cost for ditto, $4908·57; leaving a profit of $2960·33. I send you a draft for $1100 (200l.), and a splendid retort of 1·3 ozs. 2 dwts.

SWEETLAND CREEK.—*Telegram:* We have cleared up after a run of 29 days. The gross returns are $16,500; the profit is $11,350. I have paid tunnel cost $1100, and taxes $2750, and send you a remittance of $7600.

MINERAL HILL.—A letter from Mr. John Taylor, jun. (April 6) has been received, in which he states that it will be necessary for him to remain at the mines a fortnight longer, in order thoroughly to investigate everything and prepare his report. As soon as Mr. Taylor's full report is received it will be circulated, and a meeting of the debenture holders will be summoned.

CLIFTON.—The following are extracts from the agent's report, dated April 6:—The Clifton Top Level continues good, with an improving tendency. In the Clifton Tunnel the vein improves daily. We have a small bar of good looking galena. The ore appears to lie upon the foot wall. By next Tuesday we shall have broken through here, and then shall know the width of the ore. We have struck the lode to-day in the Clifton Middle Level, and expect to strike the vein in the Rara Avis middle level in a few days.

STAR OF NEVADA.—J. C. Bauer, Austin, Nevada, April 2: Report for March: During the month the remaining portion of contract No. 2, in the main tunnel, has been completed, making the tunnel 500 ft. in length; the cost of running the last 100 feet, exclusive of supplies, was $764. It is advisable to still push the tunnel ahead with a view to cut several ledges belonging to the company. Mr. Ernest has been compelled to abandon running further from want of air, and to remedy the evil has proposed the sinking of a shaft to connect with the main tunnel, and has let a contract to sink a shaft 103 ft. in depth, at $2 per ft., and furnish all supplies. Should nothing occur to retard the work the shaft will be completed about April 15. The move is a good one, will not only supply the mine with sufficient air, but do away with expense in time to come. The east level is now in 410 ft. according to survey, with no noticeable change since my last report. Mr. Ernest has given a contract to run the level ahead 50 ft., furnishing all supplies, and retains for the company one-half of the ore taken out. The amount of ore on hand, including that of lessees, ready for milling is about 60 tons, a portion of which is now at the mill, and the remainder will soon follow, but I doubt if it will be crushed sooner than April 10 or 15. As but one mill is in operation, those having ore have to bide their time. Under the circumstances I think the Star of Nevada Mine will have made a good showing. Want of air and influx of water below the east level have retarded the work of the lessees. To place the mine in proper shape for working the main shaft will have to be sunk; then the mine can be properly opened, and where $50 worth of ore is now obtained ten times that amount would be the result, and in leading ground better conditions can be obtained for the company—in a word, the importance of sinking the shaft must be apparent to all. The second east, or prospect, level has been driven 100 ft.; no ledge yet, but from general appearance ore is near at hand; more cannot be done in the way of prospecting ledges cut in the tunnel until the air-shaft is down. Total amount of expenditure for the month of March, including a balance due for contractors (for completing 88 ft. of main tunnel), of $504, is $1210.

[For remainder of Foreign Mines see to-day's Journal.]

EMMA MINE.—Recent rich developments are reported in the famous Emma Mine, Little Cottonwood, Utah Territory. At a depth of 400 feet a body of ore has been struck, running $1900 per ton. English experts who have visited the mines are asserted to have placed its value at $20,000,000.

BIRDSEYE CREEK.—The possessions of this company extend from near Hunt's Hill to the vicinity of Little York, and comprise all that portion of the deep channel Blue Lead at Red Dog, You Bet, and the vicinity beyond. The entire length of the company's claims is about 4 miles, all the bed rock of which will not probably be seen for the next 100 years. The company is an English one, having its principal office in London. It is managed by a board of five trustees, and is ably superintended by Mr. J. A. Stone, of You Bet. At present they are working three setts of claims:—The Uncle Sam, of which George H. Powers is foreman; Brown's Hill, Frank Ennis, foreman; and the Neece and West, J. R. Flagg, foreman. In the above-named claims there are from 25 to 30 men regularly employed, running from five to six hydraulic monitors, carrying from 250 to 400 inches of water each. This company is at present engaged in running a bed-rock tunnel to the Neece and West, that will, when completed, drain both that and the Brown's Hill claims. The dimensions will be 1100 feet long, 7 feet wide by 8 feet high, 260 feet of which is now completed; a hard slate formation exists as far as pierced. In addition this company own the Independence, and Bunker Hill property, and extensive claims at Sweetland. As to the amount of bullion taken out but little is known to the outside world, but when under their former ownerships they did pay extensively, and as they never looked better than they do now the supposition is that our English friends are reaping good pecuniary benefits from their enterprise.

EBERHARDT AND AURORA.—In company with Joseph Potts, the assistant superintendent, we examined this week the works of the company on Treasure Hill. The Earle Mine was passed through to the Lady's Chamber. As far as opened the Lady's Chamber is 42 feet wide, 100 feet in length, and 50 feet high. On the south end there was a fault (or slip) that cut off the ore. A drift was started in a south-easterly course. After running 130 feet, a large body of ore was found in the south chamber, that as yet has no limit. The opening is 35 feet high, 40 feet wide, and 125 feet long. In the bottom and sides of the opening rich ore is in sight. In the bottom of the chamber the ore goes down below the level of the tunnel, of regular grade. The ore body in the Risdale Chamber is not so extensive as far as opened as in the South Chamber; but is of a more regular grade, and mills from $100 to $220 per ton: 50 tons of this class of ore is extracted daily.—*Scientific Press* (San Francisco, April 6).

MANUFACTURE OF IRON AND STEEL.—The invention of Mr. G. STEVENSON (Dick and Stevenson), Airdrie, comprises improved hammering and squeezing apparatus, improved rolling apparatus, and improved apparatus for trimming the metal after it has been rolled. The improved hammering apparatus is fitted with two hammer-heads, arranged to act alternately and in directions at right angles, or nearly so, to each other on the same mass of metal, and the anvil on which the metal lies is made with an angular recess, either with one vertical and the other side horizontal, or as is preferred with the two sides inclined in opposite directions. The cylinders are fitted with piston valves, and the edges of the valves are notched, or the port openings are tapered so as to make the opening of the port more gradual as it commences. There are three such piston valves, and in one modification they work in connection with a slide valve in a separate valve chest, this slide valve being adjustable so as to alter the intercommunications. The improved rolling apparatus is arranged to be reversible by fitting it in an improved manner, with two pairs of frictional clutch cones. The clutch piece is moved to put one or other into gear by a transverse key working in a slot through the shaft, and fixed in a rod or spindle passing through the centre of the shaft. The improved apparatus for trimming the metal after it has been rolled comprises a circular saw upon a horizontal shaft, having on it a friction-grooved pinion in gear with a large friction-grooved driving wheel. The saw spindle is mounted in bearing blocks, fitted to slide in arc-shaped slots concentric with the large driving wheel, and is made to progress across the plate or bar of metal as the trimming or cutting action proceeds.

SEPARATING WATER FROM STEAM.—The invention of Mr. JAMES SHEPHERD, of Manchester, relates to apparatus for separating water from steam before admission to the engine-cylinder. The steam flows from the steam-pipe into a chamber divided into two parts by an upright partition, and containing a deflector formed with louver bars, or with inclined slots or perforations, which deflect the steam downwards into a water-chamber, where the steam parts with its water. The steam then rises on the other side of the partition, and re-enters the steam-pipe, or flows to the said pipe through the spaces between a number of metal rods, which assist in the aforesaid separation.

AWARDED TWENTY GOLD AND SILVER FIRST-CLASS PRIZE MEDALS.

IMMENSE SAVING OF LABOUR

TO MINERS, IRONMASTERS, MANUFACTURING CHEMISTS, RAILWAY COMPANIES, EMERY AND FLINT GRINDERS, McADAM ROAD MAKERS, &c., &c.

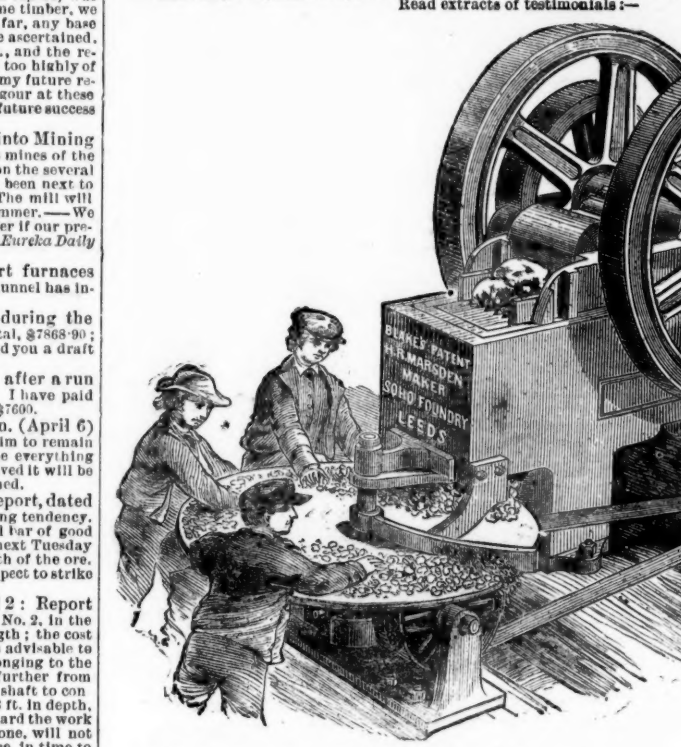
BLAKE'S PATENT STONE BREAKER,

OR ORE-CRUSHING MACHINE,

FOR REDUCING TO SMALL FRAGMENTS ROCKS, ORES, AND MINERALS OF EVERY KIND.

This is the only machine that has proved a success. This machine was shown in full operation at the Royal Agricultural Society's Show at Manchester, and at the Highland Agricultural Society's Show at Edinburgh, where it broke 1½ ton of the hardest trap or whinstone in eight minutes, and was AWARDED TWO FIRST-CLASS SILVER MEDALS. It has also just received a SPECIAL GOLD MEDAL at Santiago, Chili.

It is rapidly making its way to all parts of the globe, being now in profitable use in California, Washoe, Lake Superior, Australia, Cuba, Chili, Brazil, and throughout the United States and England. Read extracts of testimonials:—



The Parys Mines Company, Parys Mines, near Bangor, June 6.—We have had one of your stone breakers in use during the last 12 months, and Capt. Morcom reports most favourably as to its capabilities of crushing the materials to the required size, and its great economy in doing away with manual labour.
For the Parys Mining Company,
H. R. Marsden, Esq. JAMES WILLIAMS.

The Van Mining Company (Limited), Van Mines, Llanidloes, Feb. 6, 1871.—Our machine, a 10 by 7, is now breaking 180 tons of stone for the crusher every 24 hours. I may say, of all our machinery, that for simplicity of construction and dispatch in their work, they are equal to anything in the kingdom, but your stone breaker surpasses them all. W. WILLIAMS.
H. R. Marsden, Esq., Leeds.

Chacewater, Cornwall, Jan. 27, 1869.—I have great pleasure in stating that the patent stone breaker I bought of you some three years ago for mines in Chili, continues to do its work well, and gives great satisfaction. It crushes the hardest copper ore stone—put it through ¼ inch size by horse power—with great ease. I can safely recommend it to all in want of a crusher; can be driven by steam, water, or horse power.
H. R. Marsden, Esq. JAMES PHILLIPS.

Terras Tin Mining Co. (Limited), near Grampound Road, Cornwall, Jan. 1871.—Blake's patent stone crusher, supplied by you to this company, is a fascination—the wonder and admiration of the neighbourhood. Its simplicity is also surprising. Persons visiting it when not at work have been heard to remark, "This can't be all of the machine." It will crush to a small size from 8 to 10 tons of very hard and tough elvan rock per hour; taking into its leviathan jaws pieces of the hardest rock, weighing 200 lbs. or more, masticating the same into small bits with as much apparent ease and pleasure as does a horse his mouthful of oats. On every 100 tons of the rock crushed by the machine there is a direct saving to the company of not less than £5 over the process of hand labour previously adopted by them, and the indirect saving much more, the machine being ever ready to perform the duties required of it. It breaks the stuff much smaller, and in form so fitted for the stamps, that they will pulverise one-third more in a given time than when performed by hand labour.
JOS. GILBERT MARTIEN.
H. R. Marsden, Esq., Leeds.

Welsh Gold Mining Company, Dolgelly.—The stone breaker does its work admirably, crushing the hardest stones and quarts. WM. DANIEL.

Ovoca, Ireland.—My crusher does its work most satisfactorily. It will break 10 tons of the hardest copper ore stone per hour.
WM. G. ROBERTS.

General Frémont's Mines, California.—The 15 by 7 in. machine effects a saving of the labour of about 30 men, or $75 per day. The high estimation in which we hold your invention is shown by the fact that Mr. Park has just ordered a third machine for this estate. SILAS WILLIAMS.

Your stone breaker gives us great satisfaction. We have broken 101 tons of Spanish pyrites with it in seven hours. EDWARD AARON,
H. R. Marsden, Esq. Weston, near Runcorn.

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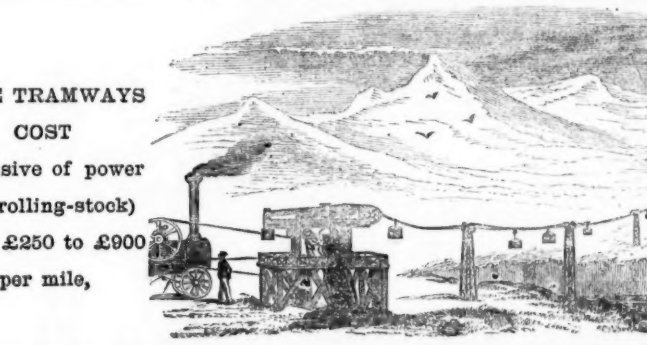
WIRE TRAMWAYS COST (exclusive of power and rolling-stock) From £250 to £900 per mile,



For quantities ranging from 10,000 to 100,000 tons per annum,

And are at present successfully employed in lengths from a quarter of a mile to fourteen miles in transport of coal, ironstone, fireclay, coke, general mining produce, beetroot, sugar-cane, &c. They are working in most difficult and mountainous districts, where any other means of transport is impossible, as well as through ordinary country.

ABOUT SEVENTY LINES HAVE ALREADY BEEN CONSTRUCTED.

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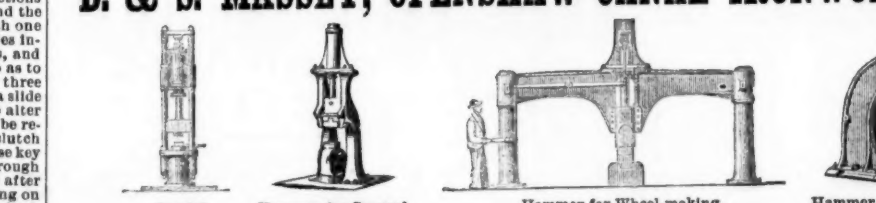

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Hammers for Engineers, Machinists, Shipbuilders, Steel Tilters, Millwrights, Coppersmiths, Railway Carriage and Wagon Builders, Colliery Proprietors, Ship Smiths, Bolt Makers, Cutlers, File Makers, Spindle and Flyer Makers, Spade Makers, Locomotive and other Wheel Makers, &c.; also for use in Repairing Smithies of Mills and Works of all kinds, for Straightening Bars, Bending Cranks, Breaking Pig-iron, &c.

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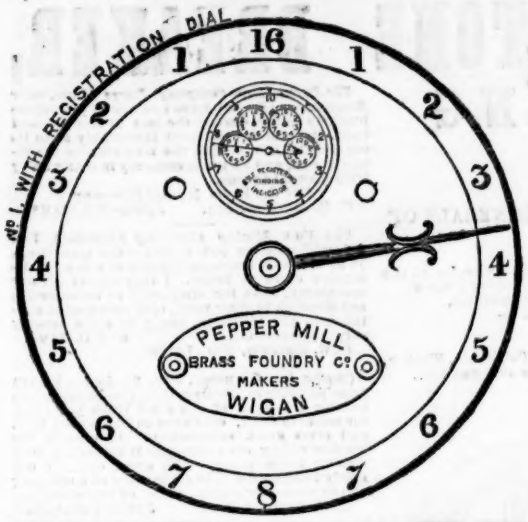
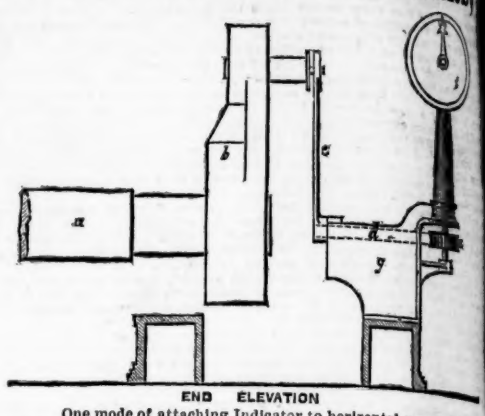


The PEPPER MILL BRASS FOUNDRY COMPANY beg respectfully to invite attention to their IMPROVED SELF-REGISTERING COLLIERY WINDING INDICATOR, which, in addition to its ordinary use of indicating the position of the load in the shaft, registers the number of windings, thus enabling the manager at a glance, and at any moment, to check the return of the banksman or tallyman, by reading off from the dial the number of windings for any stated time.

This Indicator is especially adapted for Water Winding or Pumping. Its indications cannot possibly be tampered with, and unerringly show the number of windings or strokes for any stated period, so that it will at once be seen whether or not the person in charge has been fully discharging his duty.

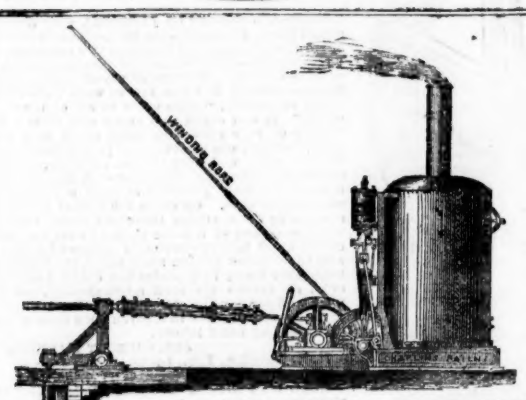
These Winding Indicators are supplied either with or without the Self-registration Dial.

The Pepper Mill Brass Foundry Company will be glad to furnish, on application, sets of drawings illustrative of the simplest and cheapest mode of attaching their indicators to engines of various constructions, either vertical or horizontal.



END ELEVATION

One mode of attaching Indicator to horizontal engine.



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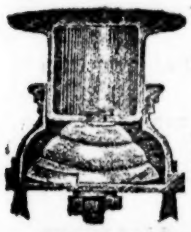

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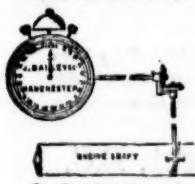

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Good and strong, price £4 4s.; worm and wheel, from 10s. to 30s. extra.
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By a special method of preparation, this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of

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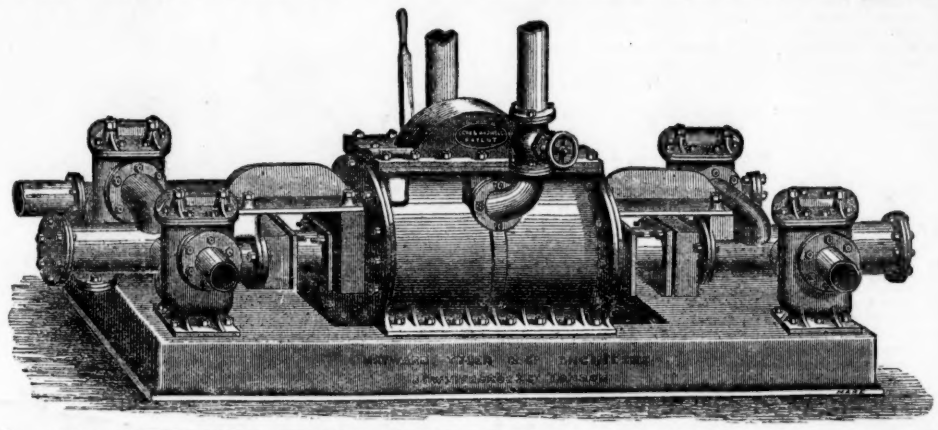

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GENTLEMEN,—In answer to your enquiry, I beg to state that the two "Universal" Pumps supplied to us (through your agent, Mr. T. A. Ashton) are doing our work exceedingly well. We think they are the best in the market, and shall be glad if you will send us another 9-inch cylinder 6-inch pump in one week from this date.

(Signed) Yours truly, ASTON MAIN COAL COMPANY.

Extract of a Letter from JOHN SIMPSON, Esq., to Hayward Tyler and Co.'s Agent.

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I should like to have the water-piston and clacks the same as in our present pump, as they work exceedingly well, and I do not think it is possible to improve upon the present pump, except by lining the cylinder with brass as ordered.

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THIS OIL is suitable to every kind of Machinery. As a lubricant it is equal to the best Sperm or Lard Oil, while it possesses the great advantage of being entirely free from any principle which will corrode the metal bearings.

For particular kinds of Machinery, the Oil may be specially prepared of a consistency and character adapted to the nature of the work to be done.

"Chemical Laboratory, 7, Printing House-square, Blackfriars, April, 1869.

"I herewith certify that the Rangoon Engine Oil, manufactured by Messrs. Chas. Price and Co., is free from any material which can produce corrosion of the metal work of machinery. It is indeed calculated to protect metallic surfaces from oxidation.

"The lubricating power of this oil is equal to Sperm or Lard Oil.

"T. W. KEATES, F.C.S., &c. &c."

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